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ARTICLE I.

INAUGURAL ADDRESS AT THE OPENING OF THE WOMAN'S MEDICAL COLLEGE OF THE NEW YORK INFIRMARY, OCTOBER 1, 1880. By M. PUTNAM JACOBI, M.D., Professor of Therapeutics.

LADIES—It is a good plan, on the threshold of any important enterprise, to pause and take a survey of the field we propose to traverse; otherwise we may lose our way, and arrive at the wrong goal at last.

Every enterprise involves difficulties. Difficulties are inseparable from any condition of existence. The question therefore always is, not "Are there any difficulties to encounter?" but "For precisely what difficulties must I prepare?" The difficulties involved in the study and practice of medicine are intrinsic and extrinsic; and we will consider each in its order.

In addition it will be profitable to inquire what especial difficulties attend the study of medicine by women; and, finally, to point out some which we have practically encountered in the working of this school.

The first intrinsic difficulty in medicine consists in the great mass of facts which it is necessary to know, and in the variety of

sciences which must be understood in order to interpret these facts. There is a general impression among non-medical people that all medicine can be learned simply by listening to what sick people have to say for themselves; that any one who has listened during a few months or years to such conversations knows all about medicine—is rich in experience; that what such an one does not know is not worth knowing. Now, in reality, such a method would not suffice to teach the pathology of a cold in the head, although a thousand sufferers related the details of their illness with the utmost loquacity. At the very outset of clinical study it is well to be impressed with this fact: namely, that what the patient has to tell you constitutes precisely the least important part of what you must learn about him in order to be able to understand his case, and to do him any good. This is not only true in regard to children, to insane people, to those who are for the time delirious or unconscious, or to those whose willful exaggerations or reticences evidently distort the description of their symptoms. It is true of every one who does not understand the pathological significance of one symptom as compared with that of another: true, therefore, of every one who is not himself a physician. Let us take an individual case—it makes scarcely any difference what. As serving to illustrate many points, I will select a case of fractured skull. The physician is summoned in haste, and learns that an hour previously the patient had fallen from a scaffolding to the street; had been picked up unconscious, and brought home in the same state; that shortly after reaching home he had vomited, but had not, as the saying is, yet come to himself. The physician finds the patient in bed, motionless and insensible. His eyes are closed, but if the lids be raised the pupils will be found to contract, perhaps sluggishly, to the light, and the lids quiver more or less if the conjunctiva is tickled. The breathing is slow and rather labored, and at each respiration the cheeks puff out as if the man were forcibly smoking a pipe. Perhaps from time to time one of the arms is raised and moved convulsively backwards and forwards, then falls again. The face is pale, but when the doctor lays his finger on the pulse he finds no sign of exhaustion; the pulse is full and hard, and rather slow. He will notice that the clothes are wet with urine.

In examining the head he finds on one side, near the vertex, that the hair is matted; and, separating the mass, he comes upon some clotted blood. He presses his finger in the center of the clot, and may find a depression below the level of the cranium. Perhaps when he presses on this depressed portion the convulsive motion of the arm will re-commence. On searching farther, he may notice a clear fluid running from the ear, on the same side with the visible fracture. Here is his case. Now, for the sake of simplicity, I have so stated it that, in regard to the main fact, the doctor is not called upon to make any diagnosis. There is no doubt about it; the man has fallen and fractured his skull. But, before the physician can understand either the extent or the consequence of this injury, he must be extremely familiar with the anatomy of the injured region. He cannot learn this anatomy from looking at the patient, nor at a hundred similar patients. He must have had the opportunity on many dead ones to dissect out all the parts, and study repeatedly their relations to each other. Then only could he know, in the first place, even that there was a brain inside the skull! Further, that the piece of bone which had been driven in by the blow had probably torn the membranes covering the brain, and even the pulpy substance of this vital organ itself. He must remember the sinuses in the membranes, and the effusion of blood that poured out from them was probably now pressing on the surface of the brain. He must be able to tell, in order to furnish the basis for his physiological analysis of the case, just what part of the surface had been injured—the part whose irritation is known to cause convulsive movements of the right arm. He must be able, from his previous knowledge, to trace downwards the direction of an invisible crack, leading from the visible fracture to the base of the skull, and splitting another portion in such a way as to allow of the escape of the clear liquid from the ear. All this knowledge, and that of other details which I omit, must the physician bring to the case from the study of the first science on which medicine reposes—the science of anatomy. He then begins to trace the relation between the symptoms he has observed and the lesion he has discovered, by means of his knowledge of the functions of the parts involved—in other words, by his

knowledge of physiology. By a violent shock the functions of important organs have been rudely interrupted. The physician who was not already well acquainted with these functions would be entirely unable to explain why a blow on the head should suspend or alter them. He could not even see any reason for the suspension of consciousness, of feeling, of power of movement, which has been induced by this blow. Still less could he understand the vomiting, the involuntary emission of urine, the convulsive movements of the arm, the puffing of the cheeks, the changes in the respiration and the pulse. In other words, unless he had an intimate acquaintance with the working of the machinery of the body while in order, he would be as little able to understand its disorder as a bricklayer to know why a watch had stopped, or a shoeblack to mend a locomotive. But the analysis of the case is not finished. The fall of a living body from a height is an event not contemplated in the physiological workings of the organism. It is effected according to physical laws, and the fracture of the skull takes place in the same way, and with the same modifications as would a fracture of any inorganic elastic globe. The radiation of the fracture, the effect of the rebound of the head from the pavement, and of the brain within the skull, cannot be studied by the aid of anatomy or of physiology alone; a third science must be invoked—that of physics. Nor is this all. I have spoken of the clear fluid running from the patient's ear. To the uninitiated this would seem to be of much less importance than the blood which matted his hair. But the physician sees in it a symptom of very serious import; he knows that it is a sign of the fracture of a certain portion of the base of the skull, and foretells almost certain death. So much he knows, or should know, as a fact of clinical experience—that is, of the clinical experience of other people; for he ought to be able to interpret this symptom as perfectly in the first case he ever saw as in the fiftieth. To understand exactly what this clear fluid is, he must, however, interrogate something else than clinical experience, for that has interpreted the matter in several different ways. The question has been solved by clinical analysis of the fluid, which has shown that it does not resemble the serum of the blood, which at one time it was supposed

to be, but the so-called cerebro-spinal fluid, which bathes the brain and spinal cord, and which cannot be removed, in even small quantities, without the greatest risk to these vital organs. The gravest feature in a case of fracture of the skull is interpreted by means of the science of chemistry.

Here, then, are four separate sciences, with entirely distinct methods, with which the physician must be to a considerable extent acquainted before he can in the least understand the condition of the patient in the case we have imagined: anatomy, or the science describing the form and relative situation of organs; physiology, or the science of the functions of these organs; physics, or the science of the movements of masses; chemistry, or the science of the composition of bodies, including the solids and fluids of the animal organism. When all these have been applied to the problem, the physician is still at the outset of his investigation. It is not enough that he sees, or even correctly understands, the condition in which the patient is; he must be able to foretell the series of changes which this condition is likely to undergo, during its progress towards death or recovery. To do this he must be acquainted with a fifth science—pathology; a science laboriously elaborated from all the experience, the observations, the clinical and post-mortem analyses which have been accumulated during the historical period of the race. Morbid anatomy is properly a branch of pathology, and nothing can be more absurd than the idea that the clinician can busy himself with the sick person during life, and leave to a specialist in "pathological anatomy" the examination of diseased organs after death. You can only properly observe the living sick man when you are able, in imagination, to pierce through the outer coverings of his body, and watch, step by step, the morbid processes which are creeping onward in the recesses of the organism. For this purpose it is essential that a science, really a branch of anatomy, but often regarded as distinct, be assiduously cultivated. I mean the science of histology. It is only when the microscopic structure of the fractured bones and torn membranes is perfectly known that the physician can understand many of the minuter morbid processes whose possibility he foresees—as an osteomyelitis, a meningitis, a capillary apoplexy. Knowing what

exists, and also what is likely to occur, the physician is now prepared to intervene to help the patient, and to avert danger as far as this may be possible. In other words, having applied the arts of diagnosis and prognosis, in accordance with the laws of pathology, he is able to apply the art of therapeutics according to the indications furnished, on the one hand by surgery, on the other by the science of the properties of drugs. He will lift up the depressed fragment of bone by means of a trepan; he will apply ice to the head, to keep down hyperæmia of the meninges; he may possibly give bromide of potassium to deaden the activity of the brain when consciousness returns and delirium is imminent.

From this single illustration, you may at once learn several peculiarities of the physician's work. In the first place you have noticed that the knowledge required is not merely considerable in amount but various in kind, and that all these varieties must be co-ordinated into a single conception, which we may entitle knowledge of the condition of the patient. In every step of the physician's career he is obliged to perform this work of co-ordination; obliged not only to know in detail, but to generalize and combine.

Now the capacity for systematic mental combination is essentially a cultured capacity, and a capacity whose effective attainment is a matter of a great deal of difficulty. It is sometimes proposed to evade this difficulty by dividing up medicine into a great number of small sections or specialties, and encouraging every one to devote himself to only one. Even were this done, the difficulty in question would not be removed, but only pushed back a little. Even when a physician professes to attend only to the diseases of a single organ, he still has to do not with one disease but with an entire class of diseases. To decide whether one of *his* diseases exists, he must know enough about a good many others to be able to exclude them from the diagnosis. Or, if he cannot do this, he must get some one else to make the diagnosis for him—that is, to take out of his hands the first large part of his own work. If we suppose these preliminary questions all decided,—and no doubt to remain that disease exists in the organ appropriated by this particular specialist—we still can only understand this by means of a mass of anatomical, physiological and

clinical details, out of which he must build up the general conception of the case. Thus the mental operation is the same in kind for the specialist as for the general practitioner.

Specialists are needed for original researches, and to develop the field of medicine in such a way that it may afterward be cultivated by the general practitioner. Auscultation was once a specialty, and only a few physicians even pretended to know how to use the stethoscope. But to-day, as you are aware, scarcely any one claiming the name of physician would dare to disclaim his ability to do so.

It will always be desirable moreover, that certain persons endeavor to acquire unusual skill in some particular directions, that they may be called upon occasionally to decide in questions of unusual difficulty. But it must be left to the general practitioner to call in the specialist, as the judge calls an expert into court, to assist in making up the decision. The responsibility of the decision must always rest with the judge, or the physician,—after they have heard all that the experts have to say, and controlled their report by means of their own knowledge of the subject, and general relations of its parts to each other.

There is another way in which a specialist may be called in: namely, like a chiropodist to attend to some entirely subordinate and presumably insignificant detail. Whoever adopts a specialty for the sake of narrowing his knowledge, and not in order to deepen it, is liable to become a specialist of this kind—a mere corn doctor; with no valid claim to membership in a liberal profession.

We return therefore to our assertion that it is impossible for a real physician to escape the necessity of constantly dealing with multiple groups of facts. He cannot therefore be dispensed from the necessity of acquiring the mental culture which alone can enable him to accomplish this task. To further illustrate my meaning, I would point out that there are four successive degrees of generalization that may or must be effected by the physician. The first degree is that which I have already shown to be involved in the very simplest diagnosis of disease in a single organ of the body. In a second degree of complexity the physician is obliged to consider also the co-existence of a morbid condition in some

organ, and to ascertain which, if any, are the relations between these two. Thus, if the same patient be suffering from dyspepsia and endometritis, it is very important to know whether the dyspeptic symptoms result from the irritation of the endometritis, or whether the endometritis is the final expression of a state of denutrition originated by the dyspepsia. If, again, a pregnancy complicates the uterine disease, the question of treatment is rendered more difficult by the risks of interfering with the pregnancy.

In a third degree of generalization, the physician must rise to considerations of the pathogeny of disease, and these are inseparable from general philosophic notions to enable him to grasp the theory of the matter. Thus, in investigating a case of phthisis, the physician will go but a little way who rests with the report of subcrepitant râles at the apex of one of the lungs. It is imperative that he understand the theory of phthisis, and the relations between the theory of Bayle and Laennec, which would attribute these râles to ruptured tubercle; the theory of Rindfleisch, which would explain them by the breaking down of masses of tissue chronically inflamed; the theory of Bull, explaining the ulceration process by a diphtheritic-like infiltration. Immediately or remotely, the practical treatment of phthisis is moulded by the theory which may have been adopted.

Similarly, the practical treatment of uterine diseases must vary considerably when the theory of menstruation regards this process as a congestion, or as a plastic process of growth.

The highest degree of generalization is that involved in the pursuit of original researches. Upon this we will not now stop to speak.

Now, as I have already said, the capacity for generalizing is essentially a cultured, an acquired capacity. Whenever it seems to be natural, that is, to come without any special training, it is always wrong. That is to say, untrained persons of active minds, and who are often very ready to generalize, invariably do so from too small a number of facts or data. Hence their conclusions are inadequate or absurd. Homœopathy furnishes an excellent illustration of just this kind of generalization. It has picked up a superficial resemblance between things; has refused to analyze further the real relations of these things, and then

insists upon having discovered the true theory of their relations. Thus Hahnemann gives as an illustration of the way in which natural instinct appeals to the law of Similia: the case of a cook who, having burned her finger, plunges it into warm water; or, the boy whose fingers are frost-bitten, yet who takes care to rub them with snow. Now this accidental resemblance between the cause of the injury and the treatment explains nothing. A little deeper examination shows that, in the first case, the warm water is required to relax the distended blood vessels; in the second, the cold is needed to restore the circulation gradually and not with a rush, which might prove fatal to the tissues. In these celebrated examples, an immense fallacy is accepted, by omission of the philosophical distinction between two kinds of causes: the efficient cause, the burn, which has initiated a train of morbid processes; and the proximate cause, that is, the anatomical and physiological conditions upon which the symptoms immediately depend.

To train the mind to handle large masses of facts, it must be gradually accustomed to work with somewhat smaller masses of more accessible facts. This is the reason for that general literary education which, in all European schools, is exacted as an indispensable preliminary to medical study, and which, in this country, is often considered as superfluous. But it can only be so considered by those who have never tried to analyze the mental operations involved in the simplest medical work.

Our illustrative case shows that something else is necessary also. The senses must be trained as well as the mind. I will not now dwell upon the methods for training the senses, but only point out two facts. First, that the facility and accuracy with which the senses work, is largely in proportion to the amount of mental training that guides their operation. You can see, hear and feel a hundred fold more when you know beforehand exactly what is to be felt, or heard, or seen; and when you have an ideal standard with which you can compare the results furnished by your eye, ear, or finger. In the second place, it is logical and much easier to train the senses by means of simple exercises before attempting more complex ones. Thus an excellent pre-

paration for learning how to observe in anatomy, is to pursue observations in botany.

It is now worth while to inquire, since the study of medicine is so vast, what proportion of it can possibly be mastered during a given term of years: in other words, what we may expect a student to know who presents himself for graduation. As the foundation of everything, a really complete knowledge of anatomy is indispensable. It will not do to know that an artery is, as the boy said of Abraham, "there or thereabouts." It will not do to have a general idea that the nerve centers are divisible into a cerebrum or cerebellum, medulla and spinal cord. The anatomical knowledge that is not precise and accurate is as unavailable for the physician as would be a general idea of the county in which a person lived, to the postman charged to deliver a letter to him.

There is another reason for demanding completeness of knowledge in regard to coarse and fine anatomy, and that is, that it is so readily forgotten in after practical life, and requires to be so constantly revived by fresh reference as wanted. Students are apt to think that therefore it never need be fully known at any time. This is a great mistake. What has once been firmly stamped upon the mind, can easily be revived; what has always been vague, will always remain so, unless there take place such a radical change in mental habits and methods as we have no great reason to expect. The science of chemistry, so far as regards its relations to medicine, should also be perfectly known at the outset, and can be known because these medical relations of chemistry are at present comparatively so few. Physiology, on the other hand, embraces a much wider field—more indefinite and more complex details. The knowledge acquired of it during a medical curriculum, must be small as compared with the relative amount attainable in anatomy and medical chemistry. But absolutely, this amount is considerable. It is of the greatest importance that the student learn to distinguish the different degrees of certainty which exist between the various physiological doctrines he hears enunciated. It is in studying them that he is first introduced to the peculiar difficulties of the study of medicine, inherent in its imperfection, in its complexity, and in its pro-

gressive character. It is impossible to study physiology by the memory alone. Even to remember its details requires a habit of mental poise—a capacity for criticism and judgment which is only acquired by very careful training. In testing the candidate therefore, we expect to find, not a complete knowledge of physiology, but an *accurate* knowledge of certain fundamental facts, familiarity with accepted methods for both the acquisition and application of physiological knowledge, and some trained judgment in regard to the grouping of facts known; finally, sound and vivid perceptions of the relations of physiology to medicine, and of their constant interdependence upon one another.

Coming now to medicine proper—what may we expect a graduating student to know? It is a mass of knowledge so vast (often *so confused*), so unsystematically grouped together—so largely empirical,—so unequal in its development; its acquisition depends so much upon prolonged clinical experience with personal responsibility, that it is really very difficult to define just how much may be acquired; how much and what must be expected of any one after a given course of study. We can, however, say this: First—That the graduate must be thoroughly acquainted with the rules of diagnosis, and show his ability to apply them in any given case. Second—That he must be acquainted with the typical outline of all classical diseases, and thus know the symptoms upon which the diagnosis is based. Then there will be nothing to prevent him from diagnosticating even the very first case he ever sees of even the rarest disease. Whoever is able to do this; whoever has reached a stand-point from which he can scan the entire horizon of medicine, has reached a beginning whence nothing need prevent indefinite progress. But unless this beginning be reached, the physician is really incapable of making the first decision about any one who comes to his office, or who calls him to their bedside. A doctor who did not know that coryza was one of the symptoms of syphilis, could not safely pronounce with positiveness upon the nature of an apparent cold in the head. Another, who knew of no eruptive fever but measles, would certainly be incompetent to decide that the rash in a given case were not scarlatina or small-pox. No young physician can be expected to know all about all diseases; but he must be acquainted with at

least the existence of all that there is to know about. And he must, moreover have attained sufficient mental breadth and grasp to be able to keep the recollection of all firmly and clearly before his mind at the same time. Now this knowledge is really quite attainable by a curriculum of three or four years duration, if the study be sytematically and intelligibly pursued.

The art of therapeutics is much more difficult of acquisition. The treatment of a disease involves many more considerations than even does its diagnosis; and these are susceptible of much greater variety in grouping. Surgical therapeutics, or, as you would perhaps call it, operative surgery, is much the simplest, and, accordingly, is much farther advanced. The logical method would prescribe that before studying the effect of drugs internally administered, the pupil should be carefully trained to watch the effect of the topical applications, the various manœuvers and operations, by which a surgeon deals with cases of external pathology. The question that meets us at the outset is, Is it really possible for us to produce any definite effect upon the processes of a living organism? This question is at present better answered in surgery than in the domain of internal medicine; and we should therefore seek for the answer first there. Yet so easily are we deluded into believing that whatever is familiar is simple, and whatever is unfamiliar is abstruse, that I suppose there is not one of you who would not believe that the action of a dose of castor oil was much easier to understand than the action of a fracture splint; or, again, that any woman physician might be expected, in virtue of her sex, to know something of pessaries, but need not be expected to know anything of orthopœdics, although a pessary for the replacement of a dislocated uterus is strictly a surgical and, by analogy, at least, an orthopœdic apparatus. What we may expect of a student at graduation is, to know the precise physiological action of drugs so far as this is known at present; to know the principal variations in such action occasioned by disease; to know the principal indications for the use of the drugs; and, finally, the principal diseases in the course of which these indications present themselves. It is unnecessary to add that he must know the doses and preparations of these same medicines.

To apply my previous test, I would say that the theoretical possession of this amount of knowledge is quite attainable in three or four years. The practical availability of it, is attainable with such slowness and difficulty, that it would really be desirable to pass a law forbidding any young physician from assuming the full responsibility of prescribing until, for a year, privately or in hospitals, he had practiced under the close supervision of some one else.

The work of co-ordinating multiple facts, which I have said was the characteristic work of the physician, must be begun by the student in his most elementary attempts at mastering knowledge. This is the only way in which he can remember the immense amount of facts he is expected to know. He must bind them firmly into a single bundle, or a definite number of single bundles, or they will all fall apart like scattered sticks.

Every time you learn anything new, you should stop and ask yourselves whether you know everything which is implied in that knowledge. In studying the anatomy of muscles, you have an opportunity of reviving your knowledge of the bones on which they are inserted. In studying the course of arteries and the distribution of nerves you refresh your recollection of the muscles which serve as landmarks to them. In observing any case of disease in the college clinics, it should be your self-imposed duty to ask yourselves if you know all about the anatomy, histology, and physiology of the organs involved in the disease. The constant, faithful, patient repetition of these inquiries would continually render the co-ordination of your various studies more and more easy to you; would train you in the capacity, invaluable in a physician, of bringing to bear all your knowledge at any given point, and of turning it to account wherever it was wanted. For here is the immense peculiarity of medical knowledge—it must all be turned to account. It is tremendously, often terrifically, responsible. It is this sense of responsibility which should be constantly impelling the medical student to a determination to *grasp* a subject, instead of remaining content to wabble about in it. Medical knowledge is not something which can be purchased and applied to a patient like a plaster or a poultice; it is something to be handled—like a tool, like an ax—and the effective-

ness of the handling depends upon the firmness of grip of him who holds the instrument. This fact involves a double responsibility on the part of the teacher. It is not sufficient to expound doctrines and convey information; it is essential to train the minds of the persons who are expected to profit by it. This requires systematic intellectual gymnastics; requires repeated practice in all the mental operations which, in after life, the student will ever be called upon to perform. Thus he must be taught, he must probably be compelled, not only to remember approximately, but accurately; not only to be able to think when at leisure and unencumbered, but under strong pressure, and perhaps in the midst of the most embarrassing circumstances; to express himself, not only in a slovenly, awkward, halting manner, calculated to make nervous people impatient, and timid people alarmed, and arrogant people contemptuous, but in such a clear, concise, forcible way as shall always compel attention and extort respect from the very midst of hostile criticism. The physician, like the soldier, must be trained to act under fire; and a training for mere holiday manœuvers, out of sight of the enemy, is lamentably insufficient for the purpose. Human minds are not pint-pots, into which we may pour water or milk or wine at our option; nor are they often Danaides, which may be quickened simply by immersion in a golden rain from heaven. They are living organisms which can only use what they have assimilated and digested, and wrought into the texture of their inmost fibers.

This vigorous assimilation demands qualities of grit, which are as much moral as intellectual. Many moral qualities are needed in the practice of medicine to meet the difficulties which, though extrinsic to the case considered as an intellectual problem, are very important in its practical discussion. The fundamental difficulty of all lies in the fact that so much depends not only on rigid adherence to rules (and there are many more rules for guidance than you might sometimes suppose), but that nevertheless the final arrangement must be left to the individual tact, discretion, and judgment of the practitioner. The theoretical and practical are inextricably intertwined; and the promptness with which theories will often be found to effect modifications of practice, in itself renders medicine one of the most interesting spheres of

human existence. Hence in the most abstract reasoning—if the physician be capable of such—he must always keep his mind intently focussed upon the practical purpose towards which it must converge. He must see all his reasons, not hovering about in the air, like bodiless cherubs, around the bed of his patient; but embodied in tangible facts and and definite actions. He must see that his antiseptic fluids actually reach the infected surfaces; he must see that his hot baths are of a given temperature, and that his cold applications are renewed as often as they grow warm; he must know whether the medicine prescribed has been vomited, whether the food has been given at the stated intervals, whether the pulse has responded to the stimulant. He must know how to enforce his directions, in spite of the reluctance, or indifference, or carelessness, or stupidity, or forgetfulness of his patients; in spite, moreover, of the interference of friends, who invariably try to persuade the sick person to call in another doctor. In many cases the physician must almost, as it were, carry his patient in his arms, encouraging, urging, consoling, inspiring him. To do this he must be capable of sympathy with physical suffering, at once delicate and profound. To be efficacious, this sympathy must be fine, and not blubbering; it must feel for the patient ten times, a hundred times as much as it audibly expresess for him; it must manifest itself in deeds, not in words; in indefatigable efforts to accomplish the essential, not in rambling talk about irrelevant trifles, even when, to the sick person, these seem to be the most important.

And at the same time, while treating his patient as though he were a personal friend—while, if necessary, risking his life for him—the physician must never forget that this same patient is, from the nature of things, a possible enemy. A physician prescribes somewhat as the Spartans under Lycurgus were permitted to propose a new law. If the proposition succeeded, the innovator was honored immensely; but if it failed he was put to death. By the most scrupulous honor and the most conscientious care, the physician is bound to justify a claim to the absolute confidence of his patients; but he must never give them his. He must never be off his guard; never forget that he is the object of incessant criticism, not only for what he does, but also for what he

does not do, and for every detail of his way of doing. It is essential that in every detail, in every expression, in the entire mental atmosphere of the physician, the patient should feel himself in the presence of a superior person. He must be conscious that a mind warm, vivid, and penetrating is dealing with his case. He must be conscious, also, that, notwithstanding this personal sympathy, the physician is studying his case as coolly, impartially, abstractly, as if it were a problem in algebra. If he does not do so—if, moreover, he fail to solve the problem—sooner or later the patient will leave him, perhaps with the best good wishes, but still he will leave him, and try his fortune elsewhere.

You see, therefore, that, in order to be a physician, it is not sufficient to have a good memory and be able to pass examinations. This is indispensable, but much more is required. The capacity to examine minutely, yet generalize comprehensively; to take large views, yet not overlook the smallest details; to be quick to notice, yet slow to speak; to reason cautiously, yet decide promptly; to be at once very cool and very warm; to be tenacious of one's reputation, yet indifferent to careless opinions; to be sensitive, yet not touchy; to be patient in temper, yet capable of wrath; to be absolutely honest, yet successfully prudent; to be unworldly, yet capable of managing the forces of the world—all these mental and moral capacities are necessary to enable a physician to study practical medicine, to practice medicine, and to build up a practice out of services rendered to a crowd of sufferers, at once helpless, ignorant, exacting, and capricious. Varied as are the mental and moral capacities required for this enterprise, they may be all traced back to three, namely: Ability to think, character to control, and honor to act from an internal instead of an external standard of obligation. When these qualities are not possessed, or have been insufficiently developed, one of two things happens. Either, in the competitive struggle, the ill-prepared physician gets crowded out by more capable rivals; or else, he manages to hold his place, but at the expense of patients, ill-treated by him, and who might have been better treated by some one else.

These patients are the persons who must be kept in view by the examining boards, who are licensed with the power to grant

medical diplomas. This power constitues a tremendous social responsibility. It is quite possible for a medical college to have no other function than that of testing candidates. This is the case with the University of London. It gives no instruction at all, but it grants degrees to all persons, who, having been educated elsewhere, are able to pass the scrutiny of its examiners. It must always be the principal function of a medical college to fix the standard of attainment;—and to point out what must be learned and what must be done to reach this: and thus, finally, ascertain as far as possible whether candidates have fulfilled these conditions. The college is then able to turn to society and say to people entirely helpless to judge for themselves: "Here is a person to whom, in perfect confidence, you may entrust your most important interests. Upon his knowledge, his skill and judgment you may rely as completely as upon that of any one of equal professional age in the profession; and upon his honor, you may at once rely absolutely." The responsibility attaching to this assertion is so tremendous: the consequences of a false assurance of confidence may be so various and so disastrous, that in comparison with it, sympathy for the disappointment of an unprepared candidate ought to be left entirely out of sight. The examining board betrays its social trust the first moment that it consents to confer a certificate of capacity upon an incapable person. In such a case, it becomes culpable of the same crime, for which, after the recent Seewanhaka disaster, the grand jury indicted the inspectors to whose false assurances of security that terrible disaster was traced.

This consideration comes up with especial force in regard to women medical students. These are still, by the majority of the public, regarded as disqualified from the practice of medicine merely by reason of their sex. The same reason is not always given. It is sometimes alleged that they have too little mental capacity; sometimes too little general education; sometimes too little physical health; sometimes that their judgment is too flighty; sometimes that their temperament is too excitable; sometimes that they have too little self-reliance; sometimes that they have too much self-assurance. But that, whatever be the

reason, they are intrinsically unable to make, or to be made into, safe practitioners.

When you have assembled together in an institution legally chartered and recognized by the State for instruction in medicine; when you find yourselves going through the same exercises as those which are being carried on in every other college in the city: ultimately brought to a commencement hall, where a band of music and a valedictory address seem to imitate to perfection those of the best equipped universities, it is not unnatural for you to feel as if all this vexed question about women's capacity for the profession of medicine had been entirely settled. In reality, however, it is not so. It has almost reached the point where it can be decided on its real merits, and on the actual results of the work done by women as physicians. But it has not quite reached even this point, since the preparation afforded to the mass of women students is still inferior to that which is attainable, if not attained by men. In the meantime, although skepticism has become more polite, or veiled, it is still much more wide spread than you would probably imagine. Only a few months ago a prominent physician of this city expressed the doubt,—in private conversation it is true,—whether, in twenty-five years from now, any women would be found practicing medicine. A professor of Ann Arbor has recently written two letters to a Michigan paper to express himself as "decidedly adverse" to the attempt of women to practice medicine. A few years ago, one of the lady trustees of this college told me that a friend of hers asked her why she had anything to do with women doctors, when it was notorious that they were all Free Lovers. Last year another lady trustee explained the indifference of so many influential people to the success of this school, as compared with their interest in the Training School for Nurses, on the ground that the latter were felt to be a necessity, while a medical school for women could only add a poorer class of doctors to an already over-crowded profession. There were more doctors turned out now every year than could find work to do in the community; there was not really any reason for helping to manufacture more. When I suggested that some of the women doctors were expected to displace a certain number of men, she was perfectly astonished.

She tacitly took for granted that all the men must first find something to do: what was left over only, could be taken up by the women.

But now this is the very point at issue. Since society is, numerically speaking, already supplied with quite enough doctors, the only way in which women physicians can possibly gain any footing is by displacing a certain number of men. In order to do so, they must evidently show qualifications superior to those of the physicians whom they displace, and sensibly equal to those of the physicians with whom they are to be ranked on an equality.

Now, it is well to at once recognize the fact that a good many difficulties stand in the way of both achievements, and these can only be surmounted when they have been distinctly recognized and systematically provided for.

It is very difficult for women to make headway against the settled opinion of society that they are unfit for final responsibilities. This opinion not only often hinders their education to responsibilities, by preventing people from entrusting them into their hands; but it reacts upon their own minds, is liable to make them hesitating, undecided, timid, and thus still more to justify the social prejudice. It is a common remark, "Women do not feel any confidence in women; in an emergency, they must always appeal to men." This, because it is the habit of centuries so to appeal; because the mass of knowledge, power, and force is still overwhelmingly on the masculine side; because, perhaps, the mass of such force always will be so distributed, and the women in positions of first-class responsibility will always be sufficiently in the minority to be deprived of the benefit of traditional influence and prestige. The claim to equal confidence as made by a woman must be a peculiarly intellectual one, because it must be sustained in spite of a conspicuous inferiority of physical strength. To produce upon the mind of the average public the same impression as may be made by a masculine physician, the woman must exhibit comparatively more force of mind and character, because the force of body is so much less, and in a question of forces the impression unconsciously received from physical size must be taken largely into account. It is like a watch as compared with a locomotive; if there be not greater precision of action in the one,

to balance the imposing massiveness of the other, the more delicate instrument must be crushed with contempt. Many mental habits of women stand in the way of their acquiring this superior precision and surety. These can only be acquired by means of repeated tests, and by the prompt rejection of all work which does not come up to a given standard. But women, as a class, are never habituated to test their work; and have an almost irresistible tendency to appeal to some personal influence to avert the consequences of its failure. I do not wish to make any protest against the habit of appeal to personal influence; it is ingrained in the nature of things and of women, and when restrained within its proper sphere does a great deal of good. But it certainly has a tendency to deteriorate the character of women's work, unless they strenuously resist it.

In the general theory of society, women are not expected to achieve anything. This theory is sometimes the reason that they are not trained to achieve anything—that their education is so flimsy and scrappy; sometimes, again, on account of this theory, so much surprise is elicited when they do achieve ever so little, that they are flattered into a very dangerous over-estimate of their own powers. In this flattery there is often concealed the feeling expressed by Dr. Johnson in his celebrated remark about a woman preaching: "It is," he said, "like a dog standing on its hind legs —it is not well done; but then the wonder is that it is done at all." The tendency of women to nestle within a little circle of personal friends, and to accept their dictum as the ultimate law of things, renders them as liable to be spoiled by this sort of admiration, as they are liable to be discouraged when they do not get any admiration at all.

The remedy for all this, however, is not hard to find. A woman must accustom herself to dispense with the personal approbation of the people she knows, as a stimulus for exertion. She must learn to work for the sake of the work; she must be ready to put into it an amount of labor as would not "pay" if estimated merely by what can be seen on the surface; she must know how to hold her own standard a good deal higher that of partial friends; she must learn, not only to keep calm under blame, but, what is much more difficult for a woman, to bear praise unmoved,

otherwise she will soon cheapen with the praise. The careful self-education of women in all these matters is so much the more important, because it is only by means of it that they can hope to overcome the more external difficulties by which they are weighted. It will not do to forget that their health is often fragile; that they often begin to study somewhat late in life, and when much needful vitality has been exhausted; that they are more frequently involved in family responsibilities and complications. At any rate there is always one two-fold dilemma. They are either pecuniarily well off, and then the force of tradition tends to keep them from working, because, as it is said, there is no occasion for it; or else they work—they study medicine, for instance—under such pressure of pecuniary necessity as leaves them barely the time or the means for adequate preparation. It is comparatively rare that the happy mean exists, where the student possesses just enough money to secure her from want, yet not enough to take away the stimulus for exertion. This is exactly the amount required.

The question of marriage again, which complicates everything else in the life of women, cannot fail to complicate their professional life. It does so, whether the marriage exist or does not exist, that is, as much for unmarried as for married women. In my opinion the increased vigor and vitality accruing to healthy women from the bearing and possession of children, a good deal more than compensates for the difficulties involved in caring for them, when professional duties replace the more usual ones, of sewing, cooking, etc. But in this delicate and important matter the facility of adjustment will vary in every individual case. Many married women will lose all interest in medicine as soon as they have children, as many now fail to develop the full needed interest precisely because they have no other, and are dispirited by isolation from family ties. Many will interrupt their practice during the first few years after marriage to resume it later. Whatever is done, either with or without marriage, can evidently be well done only in proportion as more complete intellectual development and more perfect training enables the woman to cope with the peculiar difficulties inherent in her destiny.

Women may be said to have obtained a foothold in medicine in

modern times on account of the sudden development of gynæocology. It cannot be said that women have contributed much towards this development; but in the treatment of uterine diseases the desirability of women physicians from motives of delicacy, becomes so evident, that a powerful impulse has been created in favor of allowing them to practice at least this branch of medicine. From what I can learn, the majority of women who study medicine do so with the expectation of at once becoming specialists: and certainly, the majority of persons who think of consulting them, think of them first and foremost, if not exclusively, in this connection.

Now, nothing can be more certain than, if women are enabled to practice medicine only in this specialty and for this reason of delicacy, they must, sooner or later, be again excluded from medicine altogether. I say again, because as you know or should know, women have at many different times been admitted to the privileges of medical studies and practice, but have never gained so firm a footing that they were not liable to be displaced. The motive of delicacy; the motive of self-support; the motive of desire for wider spheres of action, are all perfectly legitimate motives, but they are extrinsic to the real reason for the existence of any class of practitioners. This reason is, that such a class is in possession of knowledge which enables it to understand disease, and to cure the sick, and which justifies its members in assuming full responsibility. This full responsibility cannot be assumed, except after liberal study of the whole field of medicine. If, at present, here and there a specialist may arrive at distinction who really only knows one thing: he can only do so because the mass of the profession know a great deal more. If an entire natural class of people devoted themselves exclusively to one thing, they would soon not know even that. Instead of obtaining a position superior to that of the rest of the profession, they must sooner or later sink to an inferior one. In the case of gynæcology and women, the practical experiment has been made: the services of women have been sought on a large scale exclusively from motives of delicacy, and you know in what way. The women were merely assistants—employed to make uterine examinations and report to physicians who were strictly forbidden to

make such examinations themselves. The women experts learned as little of the subject as Milton's daughters did of the Latin they read to him without understanding it. The progress of science was retarded, and their intervention was finally discarded as cumbersome. If women will use this specialty, now often thrust upon them, as a stepping-stone to general medicine; if they will look upon it as the small end of a wedge, and persist in driving it forward to a larger end; then they may assure their position, and that of their successors, by means of this temporary opportunity. But if they do not obtain a foothold on the broad, intellectual basis of general medicine; if they content themselves with claiming this little corner, they will never really gain a high place even there: they will be driven out, little by little, until at last the gynæcological wave may pass by, and leave them stranded. There may be less liability to uterine diseases; or these may be so much more easily foreseen and prevented that much less "local treatment" remains to be instituted; or the sentiments of delicacy may change. Just imagine what would become of a class of physicians now-a-days who had devoted themselves exclusively to the treatment of scurvy or of leprosy! Their occupation would be gone with the disappearance of the disease; and the boon to humanity would result in ruin to their class.

I wish now, in concluding, to call your attention to a last class of difficulties, especially connected with medical schools for women. These difficulties all arise out of one fact, namely, that there are not as yet a large enough number of women studying medicine to support medical schools on a large scale; and schools on a small scale are inadequate, because there is is no such thing as large or small in medicine.

During the thirty years which have elapsed since women first began to study medicine in America, there have always come forward a much larger number to claim the right to practice than to crave the privilege of being thoroughly well educated. This unfortunate majority has been the cause of immense injustice to the higher toned minority, because they have constantly tended to drag the conditions of medical education down to the level of their capacity, or intention to fulfill them. The competent have often

been sacrificed, in order that the incompetent might be satisfied. A Nemesis never fails to wait upon inefficient intellectual work. It invariably grows lifeless, dull, uninteresting; it finally ceases from sheer inanition. On the contrary, nothing more is required to quicken any subject or any occupation into the most vigorous life and fertile interest, than that every one engaged in it should be inspired with an ardent desire for knowledge and for high attainment. Whenever people are content to do a thing in a slovenly and wanton manner, they very soon get to the end of it. But whenever they try to do it as well as it is possible to be done, or try to learn everything about it that any one else knows, they find themselves at the beginning of a task to which there is no end. They find more to do every day; every day, also, they find more power to do it.

If all the students of this, or any other school, were thoroughly imbued with the determination to accomplish the work before them in the best possible manner, many of the difficulties inherent in the comparative smallness of the school would vanish. You should learn to look at yourselves as a colony just landed in a new country; compelled to found a state in spite of hardship, and peril, and danger, and isolation, by means of the vigorous and intelligent co-operation of each of its members. I do not know that any more instructive reading can be found than the history of colonies, a theme with which every American certainly should be thoroughly familiar. In studying the various destinies of the early settlements of this country, you may gather many hints of importance applicable to our present situation. For us, also, the sea has been traversed, the landing effected, the howling savages, represented by the medical students, temporarily repelled. But that is about all which has as yet been done. It remains to be seen whether our colony contains in itself the stuff out of which the Bay State was built up; or rather those vicious and corrupting elements which corroded to destruction so many settlements south of the Potomac. And do you know what was the one predominating influence that led to such destruction? It was that the mass of gentlemanly emigrants, who had not learned how to dig, and who were by no means ashamed to beg; who had left the mother country, not to seek an opportunity to work more,

but to work less; to shirk all the work they possibly could; to profit by the industry and courageous patience of their companions, in order to share, without due share of labor, the revenue accruing from their tobacco and their corn. These are not the characters which could have founded Massachusetts and laid the corner-stone of that State, where, a century later, "embattled farmers could fire the shot that echoed round the world."

Their's is the stuff, these are the characters, this is the austere, self-denying, intelligent heroism, which is needed for our enterprise —for this also still deserves to be called heroic.

ARTICLE II.

THE PATHOLOGY AND TREATMENT OF YELLOW FEVER; WITH SOME REMARKS UPON THE NATURE OF ITS CAUSE AND ITS PREVENTION.

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(Continued from page 481, May No., 1881.)

PATHOLOGICAL ANATOMY.

1. CONDITION OF THE SURFACE AND INTERNAL ORGANS OF THE BODY, AS REVEALED BY AUTOPSY.

As in the majority of fatal cases of yellow fever, the patient is attacked by the disease while in his ordinary condition of health, and, as in most instances only a few days intervene between the attack and the fatal issue, the dead body usually presents its natural appearance in form and dimensions. But, as regards the color, a most striking change has taken place; for the whole skin is now of a distinct orange-yellow color, even in cases where no jaundice was observed during the course of the disease. In fact, this yellow appearance of the skin is so invariably met with after death, as to have given rise to the very appropriate and characteristic name of the disease. The intensity of the color, of course, differs in different cases; but, it may be said, that it is usually proportionate to the severity of the case. Generally, it is deepest about the head and trunk, fading toward the feet, and corresponding to the manner of its progress during the course of

the disease. Toward the end of an epidemic a number of cases are met with, in which the jaundice only extends to, or slightly beyond the knees. Very soon after death—sometimes even during the mortal agony—hypostatic congestions are observed, especially around the neck, shoulders and back; but, frequently also about the face, ears, hands, feet, scrotum and penis.

In opening the *cranial cavity*, the *dura mater*, with the exception of the yellow tint which it presents, is usually found in a normal condition. In some instances, a smaller, or larger number of Pacchionian granulations, which, however, bear no relation to yellow fever, are met with. The serous fluid, contained in the arachnoid cavity, and also the surface of the brain covered by the arachnoid membrane and pia mater, present the same yellowish color. This coloration, moreover, is observed in all the tissues of the body, extent and intensity being proportionate to the severity of the case. The *pia mater* is almost always found more or less congested. Very frequently, not only the larger and smaller veins are filled with blood, but also the cerebral and basilar arteries with their arterioles. In some cases I have found the congestion to extend over the whole of the cerebrum and cerebellum, while in others it extended more or less only over the parietal and frontal lobes; but, the pons varolii and medulla oblongata were invariably found in a state of considerable hyperæmia. The *arachnoid membrane* is frequently opaque, or even slightly thickened by exudation, and the subarachnoid space filled with serum. In such cases, the serous effusion has usually extended into the *substance* of the *brain*, producing an œdematous appearance of this organ. In most cases, however, the hyperæmia has extended throughout the whole of the latter, which then often appears swollen and œdematous throughout. The ventricles are then frequently found filled with a yellowish serous fluid, sometimes turbid in appearance, and the blood-vessels ramifying on their surfaces, together with the vessels of the choroid plexus, distended with blood. If the brain is cut into, the yellowish tint is observed to extend into its white or medullary substance, and the blood is seen issuing from the open ends of the cut blood-vessels. The blood-vessels of the pia mater of the cervical and lumbar portions of the *spinal*

marrow, also, are found congested with blood, particularly in the latter region; in some cases, even, opacity of its arachnoid membrane is observed throughout the whole region.

In the thorax, the *lungs* generally present a normal appearance, though in some cases, smaller or larger portions of these organs are found congested, or in an emphysematous condition; other pathological changes met with do not properly belong to yellow fever. The *pericardium*, with the exception of the yellow tinge, is usually normal; but the fluid within its cavity, also tinged yellow, has sometimes appeared to be increased in quantity. In uncomplicated cases, the *heart* is generally found normal in size and form, and no changes are observed on its valves and tendinous structure, though the endocardium is frequently marked by the yellowish tint. In many cases, however, its muscular tissue, when cut, presents a pale yellowish hue, and is rather soft in consistence; sometimes to such a degree as to be quite friable, and easily torn. In the latter instances, its reddish flesh color has entirely disappeared, and yielded to a pinkish yellow tint, indicating a high degree of fatty degeneration. In a number of cases, I met with yellow-tinged fibrinous bands, or clots of a delicate jelly-like consistence in the left ventricle; or, also, with clots of coagulated blood in the cavities of the right side of the heart.

In opening the *abdomen*, the same yellow tint is presented by the organs enclosed in this cavity; the liquid found in the latter is also frequently yellow. The veins of the abdominal viscera, contributing to the formation of the portal vein, are almost invariably found more or less distended with blood. In many cases, the congestion can be seen by the naked eye to extend into the venules of the intestines.

The *liver* invariably presents, either in parts or throughout, the characteristic pale yellow appearance, indicating fatty infiltration or degeneration. In former epidemics, I have met with a number of cases in which this yellowish appearance was only presented by larger or smaller portions of this organ, while others presented a bluish color, indicating a simple congestion; and again, smaller portions were observed to have retained their normal appearance. Moreover, when the organ was cut and pressed,

small drops of bile were, in some instances, still observed issuing from the cut ends of the biliary ducts. During the epidemic of 1878, however, the fatty infiltration generally extended throughout the whole liver, often to such a degree as to render the parenchyma of the organ quite friable, and easy to be torn. In a limited number of cases, this organ presented more or less the well-known "nutmeg" appearance, while in others the congestion appeared to be confined to the "inter-lobular vessels."

The *gall bladder* contained, in almost every case, a greater or smaller quantity of a dark-brown, or black tar-like bile; its walls were thickened by œdema. Only in those cases in which the fatty infiltration had not extended throughout the whole liver, have I observed the bile of a lighter brownish color, and in a perfectly fluid condition.

The *mucous membrane* of the *stomach* presented in the thirty cases which I examined during the epidemic of 1878, more or less that peculiar form of congestion, to be described hereafter; and with only one exception, the stomach itself was found to contain a larger or smaller quantity of black vomit. In the exceptional case the patient had vomited the black fluid shortly before he died. As regards abrasions, or actual lesions of the mucous membrane of this organ, I have failed to discover any during the last epidemic, nor can I remember to have observed some in the cases which I examined in former epidemics. In only one case during the epidemic of 1878, I observed a black spot of an oval form, about 5 by 4 mm. in extent, in the mucous membrane, presenting a gangrenous appearance. On a closer examination, however, this proved to be an extravasation of blood into the tissue of the membrane, and not an actual lesion; its surface being smooth and on the same level with the rest of the membrane. The color of this membrane, of course, depends on the extent and degree of intensity of the congestion; though in those parts free from the latter it is generally normal in appearance. In those cases which I examined previously to 1878, I remember to have met with some in which the mucous membrane of the stomach presented but slight traces of congestion, and was unusually pale, but not friable, as has been stated by some authors. I can-

not but think that the friable condition observed by the latter, was owing to post-mortem changes.

The *spleen* presents, in the great majority of cases, a normal appearance, and when cut its pulp assumes a scarlet hue. Only in exceptional cases did it appear enlarged, or did its pulp preserve its original dark, reddish-brown color.

The *kidneys* usually present a more or less abnormal appearance, both in consistence and color, though of normal size. In a few instances only I have observed them slightly enlarged, and softened. When a longitudinal section is made through one of these organs, it is found that the medullary substance, represented by straight tubules only, has preserved its flesh color, while the cortical substance has assumed a more or less yellowish tint. In a considerable number of cases, however, this tint does not extend throughout the whole organ, for there are certain portions left presenting an almost normal appearance. In fact, I have met, during the last epidemic, with cases in which the kidneys appeared entirely normal, so that in some instances I did not care to preserve them. In certain other cases during previous epidemics, I have observed the kidneys in a high degree of congestion, marked by a bluish-red color throughout. I have never met in yellow fever with the so-called "large white or smooth kidney," characteristic of parenchymatous nephritis.

The condition and appearance of the *supra-renal bodies* will be described in the following parts of this treatise.

The *urinary bladder* is generally found in a normal condition; in a few cases only I have observed traces of a slight hyperæmia in the mucous membrane, near the outlet of the organ. In about one-half of the cases examined in 1878, I found it still to contain a smaller or larger quantity of urine, and in one case it was even found distended with this fluid.

A peculiar slightly pungent odor, similar to that arising from the perspiration of the living patient during the course of the disease, may also be observed to arise from the interior of the dead body, while it is still warm, and when its cavities are opened, or when the muscles are laid bare and extensively cut into, as is done in removing the spinal marrow from its canal. This odor, like that arising from the body of the living patient,

has at all times been perceived and mentioned by a number of physicians performing autopsies, while others have failed to detect it. The failure of the latter, however, may either have depended on a certain dullness of their olfactory sense, as once mentioned before, or upon their autopsies having been performed at a time when the body had entirely parted with its heat. In my own cases, the autopsies were made from three-quarters of an hour to three or four hours after death; in only a few instances the time extended to five or six hours. I am the more convinced of the existence of this odor, as I have compared it with the ordinary odor arising from the dead bodies of cases dying from other diseases, and on which the autopsy was performed at the same time.

The above description of the condition of the organs of the dead body in fatal cases of yellow fever, as revealed by macroscopical examination, relates in particular to the thirty autopsies which I carefully made during the epidemic of 1878; and, furthermore, to others almost as numerous, and performed at the Charity Hospital during previous epidemics, either by myself or by the surgeon or resident students of that institution.

2. PATHOLOGICAL CHANGES, OCCURRING IN THE TISSUES OF THE ORGANS DURING THE COURSE OF THE DISEASE, AND REVEALED BY MICROSCOPICAL EXAMINATION.

The pathological changes produced in the tissues of a number of organs by the direct or indirect action of the noxious poison of yellow fever, are, individually considered, by no means pathognomonic of this disease. On the contrary, they are equally observed in other diseases, whether infectious or not, in which the nutrition of the system has been disturbed and deranged, either by the interference of an infectious poison, or by the abnormal performance of the function of one or another organ. It is, therefore, only when considered as a complex, and in association with the clinical, phenomena, that these changes may receive a pathognomonic significance. But, even, without regard to this significance, the exact knowledge of these changes is so highly essential to the knowledge of the true nature of the disease,

as to render the importance of their microscopical study obvious to every physician. For this reason, I shall, in describing the pathological condition of the organs, as revealed by a close and accurate microscopical examination, enter more into the details of the subject than I have done in the preceding part of this treatise, in which the object in view was to combine exactitude of description with brevity of communication. And as this treatise is intended to be read, not only by the accomplished physician, but also by the medical student, as yet not thoroughly familiar with the more minute studies of anatomical science, I deem it practical to draw a brief sketch of the normal histology of the respective organs, before describing the pathological changes which they undergo during the course of the disease.

I shall begin with that most important and interesting tissue, the blood, which, partly solid, partly fluid, receives all matters, essential to the maintenance of the life of the body, and which, in distributing them to all its parts, represents the most important factor in the process of nutrition. But, while it thus receives and distributes the materials essential to the normal condition of the organism, it is also capable of receiving noxious substances, such as infectious poisons, from the surrounding air, which, in disturbing the process of nutrition by their deleterious influence, give rise to pathological phenomena, characteristic of the disease under discussion. The condition and behavior of the morphological elements of this liquid tissue in a number of diseases have of late formed a special subject of research and discussion, and have given rise to many contradictory statements and views. It is therefore desirable for the medical practitioner to be acquainted with the leading facts of this subject, to enable him to form an opinion of his own.

THE BLOOD.*

The colored blood corpuscles of man represent, like those of other mammalia, minute bi-concave disks, the mean diameter of which ranges, according to the very accurate measurements of *Woodward*, from .00731 to .00772 mm., though in some speci-

* A portion of the following description of the morphological elements of the blood will be taken from my last paper on this subject, embodying my own researches, viz.: "The Structure of the Colored Blood-corpuscles of Amphiuma tridactylum, the Frog and Man," published in the *Journal of the Royal Microscopical Society of London*, 1878.

mens I have observed them slightly larger. They are very delicate in substance, and being elastic and flexible in an unusually high degree, are enabled to resume always their original form when distorted by mechanical causes. In fact, the momentary changes of form, which they are constantly undergoing when floating in the liquor sanguinis, are owing to the great delicacy and elasticity of their protoplasm. In examining them under the microscope with a sufficient amplification, we observe that the most feeble current arising in the liquid in which they float, disturbs their form, either directly, or from mutual contact or pressure. When a colored blood corpuscle of man is examined in a state of rest from the front, its outline appears perfectly round. Bring it into proper focus, so that its outlines appear the most distinct, its center, to the extent of about one-third of the whole diameter appears light. Proceeding toward the periphery of the corpuscle, a slight shade is seen to arise from the light center, which, after increasing somewhat in depth, is gradually lost, to be followed by the high light, representing the convexity of the margin. This variation of light and shade is, of course, caused by the form of the corpuscle. The convex margin appears most illuminated at the highest part of the convexity, when the rays of light passing through it undergo very little refraction, while more or less shade must appear, by virtue of the refraction of light, at that part of the surface which inclines toward the center, and forming a part of the concavity; the center, finally, being the thinnest portion of the corpuscle, and very nearly flat, must, from the absence of almost any refraction, appear light. Owing to the rounded margin of the blood corpuscle, its very outlines do not appear distinct and sharply defined; on the contrary, a delicate shade is observed at the very edge, which soon disappears in the high light of the convexity. No trace of the existence of a membrane, or a membranous layer can be discovered in the fresh blood corpuscle of man. When brought into exact focus, it appears encircled by a narrow ring of a pinkish tint, much lighter than the rest of the surrounding liquor sanguinis; this phenomenon is probably owing to the corpuscle refracting the light towards its less refractive medium. The appearance of the colored blood corpuscle of man in exact profile is peculiar, and

corresponds not to the bi-concave form in which it is so often erroneously represented. Recollecting that its body represents a minute plate or disc, the peripheral portion of which, besides being convex and rounded at its border, is twice as thick as the central, which is concave; and further, that it is perfectly symmetrical at all points, it becomes evident that the outlines of its profile must be represented by two *straight* and *parallel* lines, connected at their extremities by two semicircular ones; and accordingly the side-view of the corpuscle could not reveal the concavity of the central portion. But, if a vertical section were made through the center of the corpuscle, the outlines of the cut surface would be represented by two slightly curved lines, which, directing their convexity toward each other, are connected by semicircular lines, the whole showing not only the bi-concave form of the central, but also the convex and rounded form of the peripheral portion of the body.

The color of a single blood corpuscle when seen under the microscope is not yellow, as has been stated sometimes, but more of a light greenish tint. It is only when a number of blood corpuscles are collected into a small mass or group, and rest upon each other, that the original greenish tint merges into a yellow. With the increase of the thickness of the mass, the yellow becomes darker, and finally passes into the scarlet red, as seen in a drop of blood.

Soon after a small drop of human blood has been put on the glass slide and covered with the plate of thin glass, a number of blood corpuscles are observed to change in various manners, and in a slighter or greater degree, their original form. In some instances the convex peripheral portion of the corpuscle appears to shrink in thickness at one point, while the rest of it swells and gains in diameter, so that the whole body assumes a wedge-like form. In other instances the blood corpuscle assumes the form of a shallow basin, an appearance which is very probably caused by a contraction of the convex border of only *one* surface, by which process the concavity of this surface increases in depth, while the other surface is rendered convex instead of concave. If the contraction continues, the corpuscle assumes the form of a deep cup. Whether during this process the central portion

increases in thickness, while the convex periphery is rendered thinner by the contraction, is difficult to determine; but that the contraction takes place only on *one* surface of the convex margin is obvious, for, if it occurred throughout the whole margin, the corpuscle would not become cup-shaped, but would preserve its original form of a disc, though its central portion might gain in thickness, while the concavities of its surfaces would decrease in depth, or entirely disappear. Sometimes the convexity of these cup-shaped forms terminates in a conical protuberance. There is another very singular form observed, difficult to describe, but resembling in some respects the wedge-like form, with the exception of the narrow portion of the wedge; instead of being straight, assuming here the form of a Y, showing that the body must be three-sided.

Intermediate forms, similar to those above described, are observed; but it will be noticed that in all these instances it is only a portion of the protoplasm of the blood-corpuscle which is contracting, while the rest is expanding in compensation of the contraction. There are, however, other changes occurring in the form of the corpuscles, owing to a contraction of the protoplasm throughout the whole body, and accompanied by a considerable diminution in size. As the result of such a contraction we may regard those familiar forms of blood corpuscles, generally compared to a mulberry or thornapple. These, when occurring on the blood corpuscle of fresh blood, and without the action of a reagent, have generally been attributed to the evaporation of the liquor sanguinis. With the increase of the density of this liquid, namely, an exosmotic current from the blood corpuscle is supposed to be induced, causing shriveling of these bodies. If this view were correct, those corpuscles nearest to the edge of the film or layer of blood under the covering-glass, should first undergo the changes in question. But this is not always the case; on the contrary, single mulberry or thornapple-shaped blood corpuscles are observed among the mass of unaltered ones in the center of the preparation, immediately or soon after the blood is placed on the slide. Soon after, other individual corpuscles are seen to assume these forms, the number increasing with the time, until finally whole groups or the entire mass may undergo this

change. In other instances, considerable portions of the blood corpuscles of the preparation may, soon after the blood is put upon the slide, contract at once, and assume the thornapple form, appearing almost as if affected by a general contagion. The thornapple form may even be produced by the action of water, as I have observed. The form of the blood corpuscle, when gradually and slowly undergoing these changes, seems to pass through several phases. The first deviation from the original form observed consists in minute elevations and protuberances, arising from the surface of the corpuscle at its rounded margin, thence, while increasing in number, extending over the entire corpuscle. Next, the protuberances, at first of a conical form, become gradually smaller in diameter at their base, while their points or summits enlarge to assume the form of an imperfect knob, resembling a granule. It is at this stage of the change that the form of the blood corpuscle has been compared to that of a mulberry. As the change continues the globular projections become thinner, until finally they are transformed into minute, sharp, spinous processes. In this state the blood corpuscle resembles a thornapple. But it is not necessary that, when the change of form has set in, it should pass through all the stages to the ultimate thornapple form; on the contrary, the contraction may cease at any stage of the process, or even cause at once the mulberry or thornapple form. Very little alteration in the general form of the corpuscle is observed to take place by this process; it is not rendered spherical, as might be supposed, but represents still a disc, though the concavities may have disappeared from its surfaces, or even be converted into convexities.

The colored blood corpuscles of man are also endowed with the power of spontaneous motion, protruding and *retracting* minute processes similar to those observed on the thornapple form, a phenomenon which I first discovered in the summer of 1871, and which shows that these bodies not only possess a certain inherent power of contracting their bodies, but also of resuming their original form by a subsequent expansion, a characteristic property of the living protoplasm, enabling the corpuscle to manifest these motions, though not to so great an extent as is seen in the colorless. Keeping in mind this inherent property of the colored

blood corpuscles, a part of the difficulty hitherto encountered in tracing these various spontaneous changes, occurring in the form of these bodies, to their cause, will be removed.

Nevertheless, as these changes are not only observed to occur in different localities of the same preparation of blood, and under different circumstances, but, moreover, are observed to occur in a greater or less degree in different specimens of blood taken at different times from the same individual, much doubt will still remain as to the true cause of the phenomenon, and the conditions under which it is manifested. The question, therefore, arises: Do these changes of form indicate progression and development, and a high degree of vitality residing in those blood corpuscles exhibiting them, or do they result from a loss of vitality, and are they manifestations of retrogression and decay? In the one case, they would probably occur on the young, in the other on the old corpuscle.

If the changes affecting the form of the colored blood corpuscle, and evidently caused by a contraction of its protoplasm, were indicative of a higher degree of vitality or molecular action, we should meet with a greater number of mulberry or thorn-apple-shaped, or otherwise deformed corpuscles in the fresh blood. But as, on the contrary, the number of these forms is comparatively small, immediately as the blood is removed from the living tissues, and, moreover, increases sometimes quite rapidly in proportion to the length of time intervening, it appears more probable that these changes of form indicate retrogression, and we may be justified in regarding them as the result of the last vital action manifested by the blood corpuscle, and portending its death.

When a very small portion of human blood is spread upon a glass slide, and after being covered by a thin plate of glass, a drop of water is added to the preparation, it will dilute the liquor sanguinis and induce an immediate escape of the hæmoglobin from the blood corpuscles, rendering the liquid in the vicinity of the latter, according to their number, more or less turbid. At the same time the blood corpuscles will be set in motion, and float away in the clearer parts of the liquid. Continuing to part with their coloring matter, they are gradually rendered pale, and finally appear as mere shadows. If now a portion of the liquid is

removed by the careful application of a minute point of a piece of blotting paper, and its place filled by a small drop of clear water, the shadow-like blood corpuscle—if examined by a first-class objective—will appear bordered by a delicate double contour. The central portion of the corpuscle, encircled by the inner contour, appears now of the color of the field, while the margin, included by the two contours, appears lighter when put into the exact focus. This double contoured margin represents the outer portion of the protoplasm of the colored blood corpuscle forming the surface, which is denser in its molecular constitution than the rest of this substance, enabling it to withstand the solvent action of the water, endosmosing into the interior of the blood corpuscle, while the rest of the protoplasm is discolored, and perhaps dissolved, or otherwise affected by the action of this fluid. In the fresh and unaltered condition of the blood corpuscle of man, this denser portion of the protoplasm, forming a very thin layer on the surface of the latter, cannot be demonstrated, having the same index of refraction as the rest, but by the action of water, or of solutions of certain other reagents, it becomes visible in the form of an artificial or pseudo-membrane, for which reason I have named it the "membranous layer" of the blood corpuscle.

The changes produced in the colored blood corpuscle by the action of water are equally observed when these bodies are treated by a number of other reagents, both in liquid and gaseous form; they mainly consist in the escape of the hæmoglobin, contraction or coagulation of the protoplasm, and change of form. The action of the chloroform vapor particularly is very rapid in causing the escape of the hæmoglobin, though it does not dissolve the corpuscles as has been stated.

As regards the colorless blood corpuscles of man, it may be stated that they consist of a pale, finely granular protoplasm, inclosing, in most instances, one homogeneous disc-shaped nucleus, though sometimes two nuclei are observed. In the fresh blood, a considerable difference exists in the size of these corpuscles. In the protoplasm of the larger corpuscles, a group of dark-bordered granules, much larger than those properly belonging to the protoplasm itself, and rather similar to the pigment granules of the gangloin cells of the nervous centers, are observed. If a speci-

men of blood is examined fresh, and under the proper condition, these dark granules may be observed to perform certain oscillating movements, while the pale granules of the protoplasm also exhibit a constant motion, though more rotary or molecular in kind, and not as active as that of the former. Besides these movements of the individual granules—which seem to be identical with the well-known "Brownian movements" of minute particles—there are the so-called amœboid movements, in which the entire protoplasm of the colorless blood corpuscle takes part, consisting in a continuous change of form by the alternate projection and withdrawal of larger or smaller processes, resulting in locomotion. The amœboid movements of the protoplasm are not regularly observed to take place on all colorless blood corpuscles of the same specimen of blood; according to my own observations they appear to occur more rarely in the smaller individuals than in the larger. In some cases, these movements appear immediately after the fresh drop of blood is put upon the glass slide; in others, again, only after the addition of some water or slightly alkaline solution, or the application of warmth. In the fresh unaltered condition no enveloping membrane can be discovered on these corpuscles, but by the action of water I have frequently observed them bounded by a very delicate double contour. The proportionate number of the colorless blood corpuscles to the colored is very small, and varies in the blood vessels of different parts of the body of the same individual, as well as at different periods of the day. In the normal condition of the blood, the proportion has been estimated to be one colorless to two or three hundred colored blood corpuscles.

Besides the above described blood corpuscles, an insignificant number of very minute colored corpuscles are met with in many specimens of normal human blood. The diameter of these bodies ranges from hardly one-third to two-thirds of that of the ordinary colored blood corpuscles. They have been called "microcytes," and regarded as younger individuals; a view corroborated by my own observations on the development of the colored blood corpuscles in the human embryo, where many of them are met with in the blood as late as the third and fourth month of embryonic

life.* The same view is taken by *Hayem*,† who met with the smallest forms of these bodies, $\frac{2}{1000}$ mm. in diameter, always under conditions where a new formation of colored blood corpuscles might be supposed, as in new-born children, menstruating women, after losses of blood, or in feeble individuals. I have frequently observed these minute corpuscles having assumed the thornapple form.

Independent of these minute colored corpuscles, however, not unfrequently other elements are met with in normal blood, not larger than minute organic granules, and colorless. They have been seen and described under different names by different observers, and have been generally considered to be derived from the granular protoplasm of the colorless blood corpuscle. When first known as the "elementary bodies" of *Zimmermann*,‡ who had demonstrated them in salted blood, they were regarded as the colorless remains of disintegrated colored blood corpuscles (Henson), and to be identical with the granular formations, previously met with in the blood by *Max Schultze*; *Béchamp* and *Estor*, who also observed these granular elements in the blood, called them "microzyma;" and, observing under the microscope a colored blood corpuscle breaking up into a number of these microzyma, while, on the other hand, they also observed a number of these elements aggregating and forming a colorless blood corpuscle, they concluded that all blood corpuscles represented aggregates of microscopical organisms.§ Elements, identical with the above, were moreover mentioned by *Bettelheim* and *Lostorfer*. Under the name of "hæmococci," they were subsequently described by *Nedsvetzki*‖ as minute round bodies, resembling the granular particles of the colorless blood corpuscles, and forming normal constituents of human blood, becoming very distinct with an amplification of from 900 to 1,000 diameters, and found in large numbers among the colored and colorless corpuscles. In the dead colorless blood corpuscles, he observed molecular motion to take place, and, furthermore, the formation of a light zone

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†*Virchow u. Hirsch*, Jahresbericht fuer das Jahr, 1877, Vol. I., p. 38.

‡ *Rollett*,—Stricker's Handbuch der Lehre von den Geweben, etc., p. 300.

§ *Virchow u. Hirsch*, Jahresbericht f. d. Jahr 1870, Vol. I, p. 18.

‖ l. c.—für das Jahr 1873, Vol. I, p. 50.

around them, into which the minute granules entered, and thence passed into the liquor sanguinis, where they continued their movements in the same manner as in the hæmococci.

At present, there remains no doubt but that all these granular elements, met with in normal blood, and named differently by different observers, are derived from the finely granular protoplasm of the colorless blood corpuscles, and the movements they may exhibit are simply "Brownian" in their nature. I have frequently met with protoplasmatic remains of colorless blood corpuscles in human blood; and, a number of years ago, in the case of a man poisoned by cyanide of potassium, I observed, eight hours after death, a number of these amœba-form masses of protoplasm without nuclei, in which the minute pale granules were still in active motion; which continued for a considerable time after the addition of water to the preparation.

Having, by the above sketch of the anatomical elements of the human blood, prepared the way for the description and discussion of the condition and behavior of these elements in yellow fever, I shall now return to the original subject. The specimens of blood which I examined during the epidemic of 1867, were obtained from hæmorrhages from the nose, occurring on some of my patients. The blood was collected in small vials, and a limited space of time, of course, elapsed, before I could examine it at my office. The microscopical examination of these specimens showed that the greater portion of the colored blood corpuscles had assumed the thornapple form, but I was unable to detect any other abnormal condition of these bodies, nor any foreign body in the specimens. In other specimens—taken during the same or succeeding years—after death from the larger superficial veins of patients at the Charity Hospital, I was also unable to detect anything foreign to this liquid. The blood corpuscles, in general, exhibited the same characters and phenomena as those of healthy blood under the same conditions. Only in one case, I observed some phenomena on a small number of colored corpuscles, which, at that time, I was unable to explain satisfactorily to my mind. These blood corpuscles, namely, presented two or three *apparent* openings, or, better said, solutions of continuity upon their surfaces, manifesting themselves by a bright light-pinkish color.

From what I know at present, this phenomenon must have been owing to the presence of minute vacuoles in the protoplasm of the corpuscles, such as I, sometime afterward, discovered on a large scale in the giant blood corpuscles of *Amphiuma tridactylum*. On some other colored corpuscles of the same specimen, I observed the membranous layer of the corpuscle separated from the rest of the protoplasm, a phenomenon which I also subsequently observed on the colored blood corpuscles of the frog. As, in these cases, the blood had been taken from the dead body, it is obvious that the phenomena observed were owing to the post-mortem changes, for which reason I attached no importance to the observation.

During the month of August, in the midst of the epidemic of 1878, I made, more systematically than before, a series of examinations of the blood of living patients at the Charity Hospital. They were made in the following manner: The microscope being placed near one of the windows of the ward for the purpose of obtaining the best light, and with everything required for the examination, such as glass slips, covering glasses, etc., in perfect order and readiness, I went to the bed of the patient, and to obtain the blood made a small incision into his forearm. Knowing from my former researches upon the normal blood that the colored blood corpuscles of the first drop, issuing from the capillaries of the skin, are more liable to changes of form, when placed upon the glass slide, than those coming from deeper parts, I took the precaution of making no use of the first drop, except in a few instances. For this reason, the skin was again cleanly wiped, and a small portion of the blood next appearing in the incision quickly—at the bedside—placed upon the glass slip, and covered with a very thin and small cover glass. As soon as covered, it was put upon the microscope for examination.

Previous to these examinations of the blood of the living patient, I had observed in some sections of liver and of some other organs, taken from yellow fever cases, extravasations of free hæmoglobin from the capillary vessels, and its absorption by the surrounding cells; and, in accordance with this observation, I somewhat expected to meet with free hæmoglobin in the blood

itself, supposing its escape from the colored blood corpuscles to be caused by the action of the specific poison of the disease upon the latter. And, by coincidence, I really found in the first specimen which I examined some of this coloring material, which, however—as must be remembered—is a phenomenon not unfrequently met with, even, in the examination of normal human blood. In this specimen, moreover, I observed that the greater portion of the colored blood corpuscles presented mulberry and thornapple forms, while the rest was rapidly assuming them. In all other respects, with the exception of a few microcytes, the blood appeared perfectly normal. *Not a single bacterium, or spore of a fungus*, was I able to discover, though I honestly endeavored to do so. In the next specimen of blood which I examined, and which was obtained from the same patient and from the same incision, I did not even meet with the free hæmoglobin. But, as in the first specimen, in this also, the greater portion of the colored blood corpuscles had already assumed the mulberry or thornapple forms when first seen under the microscope, while the rest was undergoing these changes quite rapidly.

In this manner I examined the blood of *fifteen* living patients, representing the different stages of the disease: that is, from the second day to one-half hour before death, or to convalescence. Two specimens of blood were examined in each case; in some even as many as three or four, but on different days. In all the cases, with the exception of two, the blood corpuscles presented the mulberry and thornapple forms, adhering frequently to each other in the form of rolls, forming irregular anastomoses. In a number of these cases the blood corpuscles had already assumed these forms and arrangement when first seen under the microscope; this was decidedly the case in a specimen of blood taken from a patient during the agony of death. In the two cases of exception, the colored blood corpuscles presented an appearance as normal in form and character as I ever beheld, and, moreover, retained it for a considerable time. The patients here were both Germans; the one, a boy, of 15 years, who had arrived at New Orleans by an English steamer three weeks before he was taken with the disease; his blood was examined on the fourth day, during the second stage of the disease; he recov-

ered. The other was a strong and hardy young man of 22 years, a gardener, who had arrived from Germany during the month of February, 1878; his blood was examined on the second day of the disease, when he was very restless and slightly delirious; he died on the fifth day.

As regards the colorless blood corpuscles in the specimens of blood taken from the above-mentioned fifteen patients, nothing specially abnormal could be discovered. In one specimen only, taken from the blood oozing from a slight wound of the ear of a patient, and during the second stage of the disease, the relative number of these corpuscles appeared to have slightly increased, and amœboid movements were observed on some of them. In the other specimens, most of the colorless corpuscles observed belonged to the smaller kind, performing no amœboid movements, their number being, as far as I could judge, in a normal proportion to the colored blood corpuscles.*

Two specimens of blood, obtained two hours after death, for the purpose of determining the relative quantity of fat they contained—the one from the portal vein, the other from the right side of the heart—were also examined. They presented nothing remarkable. A portion of the colored blood corpuscles had assumed the thornapple form, while the rest had preserved their natural appearance; they were adhering to each other, forming rolls, no bacteria or fungi-spores were met with.

In reviewing now the results of my numerous examinations of the blood, it must be admitted that the condition in which its morphological elements were found, actually offers nothing remarkable, or otherwise, which in any way could be interpreted as peculiar or characteristic of yellow fever. The only conclusion to be drawn from these observations is, that the colored blood corpuscles of yellow fever blood are strongly inclined to assume the mulberry and thornapple forms as soon as removed from the circulation, indicating, in accordance with the view I have previously expressed, a certain loss of vitality. But the significance,

*The results of my examinations of the blood in yellow fever have been corroborated by *Dr. Sternberg*, who examined a considerable number of specimens in the Military Hospital at Havanna in 1879, without discovering any bacteria, or other minute organisms, in the fresh blood. Regarding the colorless blood corpuscles, however, he met in several cases with some which presented fat globules in their protoplasm, a phenomenon which finds a satisfactory explanation in the fatty infiltration of other organs.

which this phenomenon might appear to have in connection with the particular nature of yellow fever, is lost when we consider that the same behavior of the colored blood corpuscles has been noticed in the blood of patients laboring under other febrile infectious diseases by a few observers, though others fail to mention it. Thus, *Laptschinsky** found in his histological examinations or the blood of patients, suffering especially from febrile infectious diseases, that the colored blood corpuscles formed no columns of so-called money-rolls, but aggregated in masses and lumps of different sizes and form. The individual blood corpuscles frequently appeared as if swollen and turbid, their contours being less distinct. In such cases, he also frequently met with very minute blood corpuscles, adhering to each other quite tenaciously in the form of small aggregates. The colorless corpuscles, also, appeared increased in number, their amœboid movements were distinct, and extended upon the nuclei.

Thus far, then, no particular value should be attached to the fact that, with a few exceptions, the colored corpuscles of yellow fever blood assume the mulberry or thornapple form quite rapidly after their removal from the circulation; the significance of this phenomenon should be regarded as of secondary importance. Although I presume that the cause of this unusual tendency of the colored blood corpuscles to assume these abnormal forms is probably due to a loss of vitality by the pernicious influence of the infectious poison, I do not attribute the final effect to this cause alone, but, on the contrary, rather consider their removal from the living tissue, together with the exposure to the atmosphere, as the main factors concerned in the whole phenomenon. The loss of vitality renders the blood corpuscle more sensitive to the influence of these factors, which, in its healthy condition, it might have resisted for a limited space of time. In a number of specimens of blood, taken from the living patient, a portion of the colored blood corpuscles, as above mentioned, had already assumed these abnormal forms when first seen under the microscope; an observation which might lead to the supposition that they had undergone this change while still circulating in the blood vessels. I can safely assert that this is not the case, for I

* *Virchow u. Hirsch*, Jahresberischt f. d. Jahr. 1874, Vol. I., p. 339.

do not remember that in the numerous thin sections of all parts of the brain and other organs, which I have made and examined, and in many of which—especially in those of the brain—all the minute blood vessels are filled with blood, I have ever met with mulberry or thornapple-shaped blood corpuscles. And, moreover, in order to satisfy my mind on this particular point of the subject, I have lately re-examined a very considerable number of thin sections of the brain, sympathetic ganglia, and some other organs, and obtained the same results.

But though we may not attach any pathognomonic value to these almost constantly occurring morphological changes in the colored blood corpuscles in yellow fever, they may nevertheless be regarded as a result of the febrile process in general. Of late years, quite a number of observers have directed their attention, not only to the relative proportion of the morphological elements of the blood to the liquor sanguinis, or to the relative number of the colored and colorless blood corpuscles themselves, in various diseases of the blood, but, moreover, to the morphological changes to which these bodies are liable in different diseases. The extreme sensitiveness of the blood corpuscles to extraneous influences, however, renders it in many cases difficult to determine whether the changes observed are due to the latter, or to real morbid causes; therefore, the investigator should be perfectly familiar with the morphological changes observed in normal blood, and not be endowed with a too vivid imagination.

As regards those minute colored corpusles, the so-called "microcytes," the proportionate number of which in normal human blood is 1 to 2000 of the ordinary colored blood corpuscles, they may also increase in number in certain diseases of the spleen and liver. *Vanlair* and *Masins** met with an extraordinary case of this kind, in the blood of which (a woman) they found the number of the microcytes increased to such an enormous extent, as to have only two colored blood corpuscles to 100 microcytes. This case induced the authors to apply the particular name of "microcythæmia" to this affection.

Those minute granular colorless elements, the "microzyma" of Béchamp, resulting from the disintegration of colorless blood

*L. c.—fuer das Jahr, 1872, Vol. I., p. 201.

corpuscles, may also, under certain pathological conditions, be found increased in quantity in the blood. They have not unfrequently been found, as well in febrile as in non-febrile diseases, and may give rise to very serious errors, by being mistaken for bacteria. I am much inclined to think that the statements of some physicians, relating to the presence of bacteria in yellow fever blood, were based upon such observations; or, if the bodies observed were bacteria in reality, they certainly entered the blood sometime after it had been removed from the living or dead body.

THE HEART AND LUNGS.

The observations upon these organs worthy of any remark, have already been made in the section treating of their condition as revealed by the autopsy. As regards the heart, it may be added that in those cases in which a fatty degeneration of this organ exists, the degenerative process is very rarely observed to have extended throughout the entire organ, but is mostly found limited to certain portions. The process itself does not consist in a mere infiltration of fat, as is met with in the liver, but in a true fatty metamorphosis of the muscular fibers. As fatty degeneration of the muscular tissue of the heart, however, not unfrequently takes place during the course of other infectious diseases, such as typhus, etc., and even in some other diseases of a chronic character, it cannot be regarded as pathognomonic of yellow fever.*

The *lungs* are, as has been already stated, generally found in a normal condition. In a few exceptional cases, small portions of them are found in a congested, or, also, emphysematous condition. But in consideration of these changes being observed but very rarely, they should be regarded as of an accidental origin, bearing no special relation to yellow fever. It is rather the immunity from the noxious influences of the yellow fever poison which these

* In the report of the "Havanna Yellow Fever Commission of the National Board of Health," it is stated: "that there is no foundation for the opinion that there is a fatty degeneration of the muscular fiber of the heart in yellow fever." This assertion can only be explained upon the supposition that the hearts examined very singularly *happened* to belong to such cases in which the fatty degeneration of this organ was really absent, as it is hardly probable that the type of the "yellow fever at Havanna" should so much differ from that of New Orleans; or that the expert who made the examinations, could have failed to recognize this well-known pathological fact, observed in many cases of this disease.

organs manifest, that may be considered as a characteristic feature of the disease.

THE LIVER.

The pathological changes occurring on the parenchyma of this organ, are so invariably met with in fatal cases of yellow fever, that they may safely be looked upon as a pathognomonic feature of the disease; and they should, therefore, be studied with the greatest care and attention. The close relationship in which the liver stands through its portal circulation with other abdominal organs, renders the latter liable to be involved in almost all the disorders of the former, a complication very frequently occurring in yellow fever. In such cases an approximate idea of the condition of the liver is easily obtained by observing those clinical symptoms indicating the condition of the stomach and intestines, and which may prove of service in the prognosis of the case; for it may well be presumed that the general condition of the patient very nearly corresponds to the extent of the pathological changes taking place in the liver. Thus it is, that in most fatal cases of this disease, the pathological changes revealed by the macroscopical and microscopical post-mortem examinations in the liver, are almost always found to exist in a high degree, a circumstance which leaves little opportunity to the pathologist of studying the initiary stage of the pathological process.

From the hyperæmic condition in which a number of the other organs of the body are found after death, it may also be presumed that the pathological changes observed in the liver are likewise preceded by a state of congestion. Although in all the cases which I examined during the epidemic of 1878, the liver was found affected with fatty infiltration throughout its whole extent, as already mentioned, the above view is sustained by those cases which I observed in previous epidemics, and in which portions of this organ were still found in a state of hyperæmia, preceding that of fatty infiltration or degeneration.

But, while the process of fatty infiltration of the liver is found to have taken place in all fatal cases, and thus forms a typical character of the disease, certain traces of other pathological processes are also discovered to have occurred in this organ in a number of instances, indicating probably a severer form, or other com-

plications of the disease. In the following description of the changes in the parenchyma of the liver, I shall, therefore, begin with that particular condition, observed in the majority of cases, and representing the general type.

When, in these cases, a thin section of the fresh organ is made and examined in water under the microscope, the hepatic cells appear almost completely hidden by larger or smaller fat-globules, and to such an extent as to render the application of ether to the preparation necessary, in order to get a fair view of its component anatomical elements. After the section is cleared up by the ether dissolving the free fat, the hepatic cells will be found more or less distended by a considerable number of fat-globules. The size and quantity of these globules differ in different cells, for while some of the latter may be distended by one very large globule occupying almost the whole interior of the cell, and surrounded by a thin layer of its protoplasm, others may, besides a few larger globules, also contain a more considerable number of smaller ones. The nucleus is in most cells hidden by the fat. If one of the terminal branches of the hepatic veins—intra-lobular—should be contained in the section or fragment under examination, it will frequently be found that the cells in its immediate vicinity present more or less a greenish-brown color, apparently owing to the presence of bile-pigment. Thus far, the examination of the fresh specimen reveals but little beyond the condition of the hepatic cells, and is, therefore, rather unsatisfactory. But when a very thin section of the same liver is made, after having been hardened in a solution of bi-chromate of potassa, or in Mueller's fluid, and sufficiently large for the purpose, a more perfect view, not only of the individual, but also of the relative condition of all the anatomical elements of the whole parenchyma is obtained when examined under the microscope.

In such sections (Figs. 1 and 2) it will be found, as already mentioned, that generally the cells filling up the neighboring capillary meshes of the hepatic venous radicles, present a more or less dark, greenish-brown color, in some cases mixed with a yellowish tint. The same observation is also made, in a number of instances, on the columns of cells bordering on the radicles of the portal vein (inter-lobular.) These colored cells likewise contain

fat-globules, though not as large and as numerous as the uncolored rest, showing that the presence of bile-pigment interfered not with their power of absorbing the fat. The nutmeg appearance of the liver, which was observed in a limited number of cases, as mentioned before—and in which on the contrary the inter-lobular veins were found empty of blood—was probably owing to the coloration of these cells surrounding the vessels.

It is asserted by most pathologists that in the process of fatty infiltration there is no fat deposited outside of the hepatic cells, and that the free fat-globules observed are derived from those cells, cut or torn by the knife in the making of the section. This may be true in cases of phthisis and other chronic exhausting diseases, in which the process of fatty infiltration of the liver is slowly progressing, and sufficient time is afforded to the cells to absorb the fat deposited from the blood into the parenchyma of the organ. In yellow fever, however, where this process frequently arrives at its highest degree in a comparatively short time, and where at the same time—as is true in many cases—the protoplasm of the cells itself degenerates, rendering these minute organs incapable of absorbing the whole of the fat deposited from the blood, it is not at all improbable that a portion of this substance becomes lodged in the interstices of the parenchyma. On the contrary, I may now safely assert that this is a fact, for my careful examination of a large number of well-made and prepared thin sections have not only convinced me of the presence of free fat in the interstices of the parenchyma, but also in those of the connective tissue of the capsule surrounding the organ, and that of the portal vessels (Glisson), or between the latter and the neighboring cells of the hepatic lobules.

In some of the yellow fever livers, the outlines of the hepatic cells appear in the microscopical sections less distinct than in sections made from livers affected with fatty infiltration accompanying other diseases. In the latter, when stained and mounted in Canada balsam, the cells and their nuclei, having absorbed sufficient coloring material, appear very distinct in contrast to the large fat globules which they contain. The hepatic cells of yellow fever livers, on the contrary, do not perfectly absorb the carmine or other coloring materials, in consequence of which their

outlines and nuclei appear—especially when mounted in Canada balsam—rather indistinct, and the fat globules within do not show in strong relief. Besides this, in some places of the section, the cells, being filled with numerous minute fat globules, have entirely lost their absorptive power, and, therefore, remain colorless. A great number of the nuclei also undergo fatty degeneration.

The condition of the blood vessels and bile ducts of the liver can be most advantageously studied in these thin sections. Contrary to what might be expected from the observations of some of the clinical phenomena of yellow fever, or from the occasional meeting by way of autopsy with a liver presenting the so-called nutmeg appearance, the blood vessels are, in many cases, found empty of blood. The capillaries, of which, in very thin sections, a number of meshes are frequently met with empty of cells, present here and there a finely wrinkled appearance, which is, however, owing to minute longitudinal rugae, artificially produced by the action of the hardening fluid, as well as to their complete emptiness; a fine double contour indicates the wall of the vessel, beset by the numerous nuclei, also of normal appearance. I have not succeeded positively in detecting fatty degeneration in the latter, though, in some instances, they presented a fatty luster. The intralobular veins (radicles of the hepatic) were always found empty, and their walls in a normal condition. As regards the coats of the interlobular veins (radicles of the portal), and the interlobular hepatic ducts, they were found in the same condition; only in a number of cases the lumen of the interlobular veins, and of the finer branches of the artery, were filled with blood corpuscles (Fig. 2).

With all the attention which I particularly directed to this subject, *I failed to discover any product of inflammation, either in the form of a multiplication of nuclei, or of a cellular exudate, or, even, of pus;* accordingly, *the theory of an inflammatory condition of the liver in yellow fever, which has formerly been held, and still is, by a number of physicians, proves to be fallacious.*

As regards the multiplication of nuclei in the connective tissue of the capsule of the portal canals, mistakes may easily be made by the unexperienced observer in the examination of preparations

which have previously been hardened in a solution of chromic acid or its salts, as this agent alters the colored blood corpuscles in the radicles of the interlobular veins and their capillaries in such a manner as to resemble small slightly refractive nuclei.

To the condition of the epithelium of the hepatic ducts, also, I directed my special attention, expecting to find perhaps a fatty degeneration of the cells, but though in some of the smaller ducts these elements seemed to present a fatty luster, I would not venture to positively assert it as a fact, as in the other instances they appeared perfectly distinct and normal, and, if cut horizontally, the ducts mostly showed an open lumen. In thin horizontal sections of the larger portal canals, the condition of the larger vessels and ducts, and also of that system of minute simple and racemose (hepatic) glands, connected with and opening into the latter, can be studied with advantage. In examining a number of these sections, I failed to detect anything abnormal, either in the vessels, ducts, or glands; the pathological changes were entirely confined to the anatomical elements of the parenchyma.

Although the process of fatty infiltration extends in most cases throughout the whole hepatic lobule, there are nevertheless certain portions of the latter more affected than others. Thus, it generally appears that the hepatic cells in the immediate vicinity of the intralobular vein are not affected in as high a degree as those of that region of the lobule, situated between the central and peripheral portions, or even the cells bordering on the interlobular veins (Fig. 1.) In thin colored sections, the degree of the infiltration is easily determined by the degree in which the different parts of the lobule are colored. The best colored portion is usually the central, though there are many exceptions to this rule. As mentioned before, there are certain places met with in very thin sections, in which quite a number of capillary meshes are observed almost entirely deprived of their cells. As in the vicinity of such places the hepatic cells are usually very faintly colored, or not all, it appears as if the falling out of the cells from their meshes depended on a degeneration of their protoplasm; besides, uncolored cells ordinarily contain no large fat globules, but are filled with small ones. In such places of the lobule, where the fatty infiltration has taken place in a high

degree, a number of the cells present the so-called seal-ring form (Fig. 1), distended by only one large fat globule, while others may contain two or three.

When examining the first yellow fever livers, at the beginning of the epidemic of 1878, my attention was attracted by a singular appearance of the hepatic cells, resembling a division of the protoplasm of these organs into a number of parts, indicated by shady lines. I have since observed it in many instances, and it really appears as if the granular protoplasm of the whole cell were composed of groups of granules, a supposition rendered very probable by the same observation on hepatic cells undergoing fatty degeneration, in which the same grouping of the minute fat globules is observed. However, this is not the only instance in which I observed this phenomenon, for, a number of years ago, I mentioned the fact that the granular substance in the gray matter of the cerebro-spinal axis consists of an aggregation of minute groups of granules. Even upon the protoplasm of a number of colorless blood corpuscles of man, I have frequently observed this arrangement of the granules.

The pathological changes in the parenchyma of the liver above described are such as I have observed them in the great majority of those cases of yellow fever which I microscopically examined, and from all I know, they may be regarded as typical. In a limited number of cases, however, I observed some additional changes, which either were owing to a severer form of the disease, or to previously existing affections. Thus, I met with two cases in which the coloring of the columns of cells surrounding the intralobular,—or, in some instances, also those surrounding the interlobular veins,—was of a much darker, almost blackish brown, color than in the above cases. Besides, the colored portions or patches were not only confined to the vicinity of the vessels, but moreover met with in other portions of the lobule; in one case, some of these patches presented even a reddish brown. In all other respects, the parenchyma had undergone the same typical changes as above described.

As in all these cases the color was of a greenish or blackish brown, I presume that it depended upon the presence of bile-pigment, though in those few instances where the patch presented

the reddish tint, the latter may have depended on the presence of free hæmoglobin, such as was observed in the following case. Here, namely, the patches were of such a size as to be very easily distinguished by the naked eye, and were confined to the intra-lobular veins, embracing them in their entire length (Fig. 3); they were also sharply defined from the rest of the parenchyma of the lobule. Their color was of a dark golden brown, resembling that of old apoplectic foyers in the cortex cerebri. The capillaries of the discolored portions of the hepatic lobules appeared to be compressed, only small portions of them could be recognized with difficulty. The columns of the cells appeared to have been rendered mis-shapen. In each patch, according to the direction of the section of the lobule, a transverse or longitudinal section of an intra-lobular vein could regularly be seen. Though no blood corpuscles could be discovered in the capillaries, there remains no doubt that the coloration of these portions of the hepatic parenchyma was caused by an extravasation of free hæmoglobin, derived from the colored blood corpuscles, through the walls of the vessels, and finally absorbed by the hepatic cells. Small extravasations of free hæmoglobin are observed here and there in sections of other yellow fever livers, and, as I shall show hereafter, also in other organs; but it is not probable that they often occur to such an extent as in the case last described. Nevertheless, at the commencement of September, 1879, I performed an autopsy upon a fatal case of yellow fever at the Charity Hospital, in which the pathological changes in the parenchyma of the liver were of a much graver character than I had met with before in this disease. The patient, a male, died at 9 o'clock A. M., having vomited a quantity of genuine black vomit three hours before his death; the autopsy was commenced two and a-half hours afterwards. The clinical history of this case, together with the characteristic pathological changes in the kidneys and other organs, as revealed by the microscopical examination, left no doubt about the true character of the disease.

The liver in this case was found rather below the ordinary size, and presented a peculiar aspect. The change of color of the surface—depending on the presence or absence of blood in he intra-lobular and inter-lobular blood-vessels, or on the pres-

ence of fat in the hepatic cells—instead of presenting to the eye a uniformity of character over the whole organ, differed considerably in different parts. A considerable portion of the upper surface of the right lobe had a bluish color, similar to that of an ordinarily congested liver, such as is frequently observed in malarial disease, while in other portions the congestion seemed to be confined to the finest inter-lobular radicles of the portal vein. In these portions, also, the parenchyma showed the pale yellowish tint, though not so distinctly as is usually seen in this disease. By a closer inspection, however, numerous portions in the form of larger and smaller well-defined patches, ranging in size from that of a hepatic lobule to a ten-cent silver coin, or even larger, of a decided yellow color and without traces of congestion, were discovered, especially upon the upper surface. And, furthermore, in the bluish congested portion of the right lobe, dark, bluish or reddish-brown patches, irregular in size and form, and having the appearance of extravasation of blood, were also noticed. A section through one of the patches showed that they extended in an irregular form into the substance of the organ to the extent of about one inch or more. The consistency of this liver was rather below the normal. A microscopical examination of the fresh parenchyma from the vicinity of the dark patches showed the simultaneous existence of atrophy and fatty degeneration of the protoplasm of the hepatic cells, together with a slight fatty infiltration, consisting of large fat globules.

After portions of the organ had been sufficiently hardened in Mueller's fluid, thin sections were made of different portions of the organ, and colored with carmine, the examination of which disclosed the extraordinary changes, to be now described, which had taken place in the parenchyma of this liver.

To get a correct idea of the whole pathological process which had been going on in this liver, would require a minute description of every detail, with a discussion too extensive for our present purpose. Therefore, a brief sketch of the condition in which the parenchyma was found must suffice. At the first glance through the microscope, upon a section through one of the dark bluish patches and made vertically to the surface of the organ, the anatomical elements of all the hepatic lobules contained in the

section appeared to be in a chaos and confusion; for in some places round patches, colored by carmine, were noticed, while in others certain curved columns of cells of a lighter or darker brown, or others uncolored, were also observed. In many places between these portions the cells had disappeared, and through the empty spaces they had left, the field of the microscope could be discovered. The whole parenchyma bordering the inner surface of the general capsule of the upper surface of the liver, contained in the preparation, was, to a considerable depth, found to have assumed a brown color, deepening in shade almost to black, in proportion to the thickness of the section. By repeated examinations with lower and higher powers of a considerable number of sections, I was enabled to study the condition of their individual elements and parts throughout, and, thus far, arrived at the following conclusion. Accordingly, the pathological changes observed in this case, must have been preceded by a hyperæmic condition of the utmost intensity, not only of all the branches of the portal vein, but also, as the examination shows distinctly, of the capillaries of the peripheral portions of the lobules. The intensity of this hyperæmia was such as to induce the hæmoglobin to leave the blood corpuscles, and pass through the walls of the vessels into and between the neighboring cells, a phenomenon which is usually observed in association with a stasis of blood in the vessels. But, besides this extravasation of the coloring material of the blood, a rupture of some of the capillaries must also have occurred, as, in many places, great numbers of blood corpuscles were found located between the atrophied cells. During this state of congestion of the portal veins, the circulation of the blood through the remaining portion of the parenchyma appears to have been mainly carried on by the branches of the hepatic artery, particularly by those arising in the substance of the liver, and passing to the general capsule—rami capsulares arteriosi—which, after extensively anastomosing with each other, give rise to other branches returning into the substance of the organ, and terminate in the capillaries of that portion of the parenchyma situated beneath the capsule. In the sections, these vessels are well displayed, and, as it appears, enlarged in their caliber. As a consequence of the pressure produced by the congested portal veins and

their capillaries, and, furthermore, of the simultaneous diminution of the nutrition of the hepatic cells, atrophy of the protoplasm of the latter occurred, not only of those of the peripheral portion of the lobule, but also of those of the center, surrounding the terminal branches of the hepatic veins. Thus, in examining the central portion left in a number of lobules, it appeared as if these cells consisted entirely of nuclei, each surrounded by only a very thin layer of protoplasm. Notwithstanding this atrophied condition of the hepatic cells, however, the whole mass appeared perfectly colored by the carmine, showing that fatty degeneration had, as yet, not taken place in this portion of the lobule. In most of the lobular centers a transverse, or also a more or less longitudinal section of an intra-lobular vein was seen, the lumen of which, in most cases, was filled with a fibrinous thrombus; the walls of these vessels were thickened and contained numerous small spindled-formed cells. In directing my attention to the peripheral portions of the lobules, I could distinctly recognize the form of the capillary meshes, which presented a lighter or darker brown color, the same as is generally observed on blood vessels distended with blood after having remained for some time in a solution of chromate of potassa and subsequently colored with carmine. But the diameter of the capillaries forming these meshes appeared much increased, owing to being still surrounded by a layer of hepatic cells, though the center of the mesh was more or less empty. With an adequate amplification, the blood corpuscles in the interior of these vessels could be well discerned, together with those which had escaped into the surrounding cells, colored brown by the hæmoglobin escaped from these vessels. But there were also here and there empty meshes met with, of which the atrophied cells surrounding the capillaries were colored only by the carmine, showing that they had not absorbed hæmoglobin, nor undergone fatty degeneration. In other places, similar curved columns of cells were observed, which, lying parallel with the periphery of the lobule, and, separated by empty spaces, appeared in the form of successive strata. It would be difficult to describe the details of the destructive process by which these appearances of the parenchyma were produced, though it is obvious that the empty spaces were formed by the degeneration and

breaking down of the hepatic cells of this portion of the lobule. Many of these columns, also, were uncolored, their cells having undergone fatty degeneration. Finally, in some places, every trace of an arrangement into lobules appeared to be obliterated, the remaining elements representing a confused mass of degenerated cells, broken here and there by an empty space, or by an isolated section of an intra-lobular vein. Sections of portal vessels were also observed, but their structure appeared indistinct and thickened. The greater number of these represented interlobular branches of the hepatic artery, highly colored with carmine. Sometimes, long columns of carmine-colored, though atrophied, cells were encountered, which, as I suppose, consisted of an arterial branch, surrounded by a layer of cells having, perhaps, received their nourishment from this vessel, preventing their degeneration.

From the above it will be seen that the relative pathological condition in which the anatomical elements of the lobules of the atrophied portions of this liver were found, does not exactly correspond with the condition of the same elements observed in the so-called yellow atrophy of this organ. In the fatty degeneration met with in both instances, as well as in some other minor points, however, a certain resemblance evidently exists. The view, entertained by *Rindfleisch*, that yellow atrophy depended upon an infectious poison, may be true in the case above described.

As regards the other less congested portions of this liver, which formed the greater part of the organ, they were found in the same condition as has been described as "typical" of yellow fever. However, the fatty metamorphosis, observed in this case, was a true fatty degeneration of the hepatic cells; all other elements, as capillary and other vessels, etc., were in a perfectly normal condition; in some form of these capillaries blood corpuscles were observed. There was no atrophy of the cells, they had retained their normal size, but were filled with minute fat globules, which exhibited very distinctly the arrangement in minute groups of which I have spoken above. Only in a comparatively small number of these cells, two or three larger fat globules—though not very large—were observed.

In connection with the pathological changes met in the paren-

chyma of this liver, I cannot forbear to mention a singular discovery which I made in sections made from those dark bluish portions, and relating to the presence of the mycelium of a very minute parasitic fungus, which extended its numerous filaments throughout the parenchyma of this particular portion of the liver. Not being, myself, an enthusiastic supporter of the so-called germ theory, I would have passed this observation without mention, if the circumstances connected with the presence of this fungus in such an unusual place, would clearly show that the minute plant found its way into the liver accidentally after death. But this is not the case, as the chances for such an accident were quite limited. The autopsy was made two and a half hours after death. The liver, being one of the first organs removed from the body, was put into a basin, and covered with large pieces of ice. There it remained about two hours, when certain parts of it were cut out, and, after being cut again into small cubes of about one to one and a quarter inch diameter, were put, together with pieces of kidney and other organs, into a sufficient quantity of Mueller's liquid. On the second day after, the fluid was removed, and the same precaution was twice more taken before the pieces were hardened enough to be transferred into a fifty per cent. mixture of alcohol and water. A few days after the pieces had been put in Mueller's liquid, I examined some small sections made by hand from one of the pieces belonging to that dark bluish portion of the liver above described, and observed, especially at the thin edges of the section, the fungus consisting of a mature spore with two germinating filaments arising from it at opposite poles. Each filament was bordered by a fine double contour and its interior filled up by a distinct row of granules. At the first sight of these elements, I must confess that I knew not what to make of them, until I met with a bifurcating filament, and observing, furthermore, a peculiar luster on some of the granules in the interior, I began to suspect them to be of a fungous nature. Though these elements might be confounded with long spindle-form cells, a closer examination would easily show a difference existing in the details of both. When the pieces were sufficiently hardened, I was enabled to study the further details of this fungus on the thin sections made by the aid of the microtome. From

these examinations, I found that it belonged to one of those families the most simple in construction. The elements which I first observed along the edges of the section, or floating about, represented germinating spores, each of which had given origin to two or three filaments of about four, five, or six times the length of the former. A sporangium was formed upon the terminal points of these filaments, containing about two or three sporules, the discharge of which I witnessed in a number of instances, as also the detachment of the sporangium from the filament. In many specimens, the filaments presented a number of varicosities in their course, sometimes only on one side, almost resembling suckers; in some of them the base was much thicker than the point, and filled with granular protoplasm which had entered from the mother spore; I have also seen the disintegration of the latter. In other instances, again, I observed secondary filaments arising from the first; and likewise bearing a sporangium, or even communicating with a filament of a mother spore. Not being sufficiently versed in systematic mycology, I have failed to classify this fungus, though I have consulted some standard works on the subject. Judging from its mode of fructification, however, it seems to resemble more the Peronospores than any other family.

The presence of this fungus in the parenchyma of this liver, of course, cannot be regarded as an unusual phenomenon, for it might be supposed that it was primarily contained in the hardening fluid, whence it made its way into the pieces of liver. But, then, it would most likely also have invaded all other pieces, not only of the same liver, but also of the other organs contained in the same jar. This, however, was not the case, for, with the exception of the dark bluish atrophied portions infected by the fungus, no trace of the latter could be discovered in those pieces of the same liver affected only by fatty degeneration, or in the pieces belonging to other organs. The only explanation, therefore, left to account for the presence of the fungus in the place mentioned, is, that it was primarily contained in the Mueller's fluid—though this was freshly prepared—and that it selected particularly these disorganized atrophied portions of liver as the best nidus for its development. Whether it was possible that the fungus, or its spores, penetrated by some way or other into the portal circula-

tion, and finally became lodged in some of the interlobular veins, giving rise to the intense congestion and ensuing atrophy of the parts above described, I must leave to the germ theorists to decide. At any rate, I regard the observation sufficiently interesting to be worthy of report, although I entertain not the slightest idea of its standing in any relation with the pathology of yellow fever.

The pathological changes in the parenchyma of the liver, characteristic of yellow fever, as described in the preceding pages, are equally observed in cases where this disease supervened upon another, accompanied by organic changes in the tissues of the same organ, a coincidence which may specially occur in cases of cirrhosis of the liver. An illustrative case of this kind, sufficiently interesting to be cited, I had an opportunity to observe and to examine after death during the epidemic of 1878. A young man of small stature and delicate build, an Italian, was admitted to one of the wards of the Charity Hospital. As I was present at the time, I had occasion to examine him myself. Finding him in an unusual state of nervous exhaustion—for he could hardly walk—with an intensely jaundiced skin, and a very feeble pulse, but otherwise—as could also be gathered from his history—no symptoms of yellow fever about him, I regarded the case as one of chronic malarial fever. As he could speak neither English nor French, himself, it was ascertained by an interpreter that he had been sick for two months, and had been staying with the "Spanish Colony,"—as a portion of the Spanish and Italian population of New Orleans, who, during the epidemic, had left the city to encamp several miles above near the bank of the Mississippi, was called,—whence he came to the hospital. Though at one time slightly improving from his nervous exhaustion, this patient eventually contracted the yellow fever in the hospital, from which he died. The autopsy revealed the following condition of the organs. Not only the skin, but all other tissues in the interior of the body were intensely yellow throughout. The lungs, with the exception of some old slight adhesions to the walls of the thorax, presented a healthy appearance. The heart, also, appeared normal, though the fluid contained in the pericardium was yellow. The liver was enlarged, hard, and granular, show-

ing its cirrhosed condition by gritting under the knife when cut; its capsule was thickened, and its vessels and bile ducts were congested, bile issuing from the cut ends of the latter. The walls of the gall bladder were œdematous. As the patient had thrown up black vomit not long before he died, the stomach was found empty, though its mucous membrane presented that condition of congestion peculiar to yellow fever. The spleen was greatly enlarged, five or six times the bulk of a normal spleen, and also gritted under the knife when cut. The pulp was of a dark color, while the trabeculæ appeared white and enlarged; the capsule of the organ was thickened. The peritoneum covering the diaphragm, liver, stomach, spleen, pancreas and transverse colon, was much thickened, having glued these organs to each other, thus showing that a chronic peritonitis had been existing. The kidneys were greatly enlarged and much congested. The veins of the intestines were filled with blood, though otherwise these organs had a normal appearance. In the cranial cavity the dura mater was yellow, but otherwise healthy, though the vessels of the pia mater were much congested; the arachnoid membrane was found opaque in some places. The cerebral and basilar arteries with their branches were filled with blood. The substance of the brain appeared œdematous, and the ventricles were filled with a yellow fluid. The corpora striata appeared rather pale, while the thalami optici were very white; the superficial vessels of these bodies were filled with blood. In a section of the cerebral hemispheres, the medullary substance appeared very white, the cortical layer pale gray.

The microscopical examination of thin sections of the liver showed that the cirrhosis in this case existed in a considerably high degree. The capsule of Glisson, undergoing the usual hyperplastic metamorphosis, represented now a connective tissue of a coarser and stiffer appearance, than when in its normal condition, though no proliferation of nuclei or spindle cells could any more be observed. The cicatricial tissue formed had encroached upon the lobules, and, in many places, extended into their interior, separating portions of them, which, in the section, appeared in the form of small islands. The hepatic cells at the periphery of the lobules presented a greenish brown color, while minute

masses of black pigment were here and there observed deposited between the hepatic cells. The central portions of the lobules, or, also, the portions intermediate between these and the peripheral, were invariably found affected with fatty infiltration (Fig. 4.) This condition existed in a considerably high degree, for most of the cells of the affected portions presented the seal-ring form. In the newly formed tissue of the capsule of the portal vessels the remains of blood vessels were also observed.

Very frequently, especially in cases of drunkards, cirrhosis of the liver is found associated with fatty infiltration. In these cases, however, as in those of ordinary fatty infiltration without cirrhosis, the infiltratory process almost always commences in the hepatic cells at the periphery of the lobule, while in yellow fever, as we have seen, the process appears to commence, or to attain at least its highest degree, near the center, or in portions of the lobule situated intermediate between the latter and the periphery.

[TO BE CONTINUED.]

ARTICLE III.

"SOME POINTS IN DIPHTHERIA." By A. T. CONLEY, M.D., Cannon Falls, Minn.

In the April number of THE JOURNAL AND EXAMINER is a paper by Dr. C. J. Lewis on "Some Points in Diphtheria." During nine months of last year I saw and treated over one hundred cases of diphtheria, and from my experience I must take issue with the Doctor on one or two of his points. I am fully aware that different epidemics of that disease differ widely in many symptoms, and this may be one reason that his experience is so different from mine.

The first point I wish to notice is this: The Doctor says, "I am of the opinion that diphtheria is not produced by germs, nor do I believe it to be contagious." Whether diphtheria or any other contagious disease is caused by germs, is not the point I wish to discuss, for at the best, in our present state of research and knowledge, we have little else but fine-spun theories. But

that there is a specific cause for each and all of the so-called contagious diseases, seems reasonable from the nature of things, and that this specific cause, whatever it is, can be and is communicated from one person to another, is as clearly proven as any other fact that rests on observation and reason; and that diphtheria conducts itself like other contagious diseases, observation and experience fully attest. One illustration from many I could give will suffice. Last fall in one of the departments of our public school a little girl came down with diphtheria and was kept in school all day. All the schools were closed from that day, but in less than a week eight other cases came down, and all children who were at school the day the little girl came down, and *all in the same department;* and though there were four other departments in the same building, not a child in any of them came down.

I have further noticed that where one came down with the disease in a family of children, every other child in the family was almost invariably sure to have it; and, further, where strict quarantine was enforced among the *well* and sick alike, that is, where children, though well, were kept strictly at home, *in no single case did such children have the disease.* Another point where my observations seem to differ from other observers is this: Though we had about two hundred cases in our town and vicinity, other physicians noting carefully with myself, in no case has the disease occurred twice in the same individual.

I have gone through epidemics of scarlet fever and other contagious diseases, and I cannot avoid the conclusion that diphtheria, for children, is the most contagious disease I have ever seen, excepting, perhaps, small-pox.

The Doctor gives a very condensed history of two cases. From the facts given I cannot see how he could positively diagnosticate diphtheria. To me it would have been probable had the disease been in the family and other cases been better marked. I am sure I never saw a case result from *cold.*

The second point: The Doctor says, "To me diphtheria is a pyrexia—an inflammatory fever, closely allied to rheumatism." Admitting for the moment that the argument adduced is correct, would not the same line of reasoning prove that scarlet fever or

croup are inflammatory fevers closely allied to rheumatism? Again, the Doctor tells us that "pain is a prominent symptom in diphtheria." "That the pain caused in the fauces by attempts to swallow liquids is out of all proportion to the apparent local lesion." These statements are exactly the opposite of my experience. I do not remember to have ever heard a child crying with pain or show in any way that it was suffering severe pain. I have seen the membrane thick and heavy, and so much pushed up into the mouth that it could be seen if the mouth were opened ever so little. In fact the membrane had the appearance, as near as anything I can compare it to, of a pancake rolled into a cylinder and thrust down the throat; and yet medicine, water and milk could be swallowed with an ease that to me was amazing. Occasionally there was a case of paralysis of the muscles of deglutition; stiffness of the neck and swelling of the glands were pretty constant symptoms. Again, the Doctor says, "Epidemics of diphtheria follow periods when rheumatism has prevailed." This was certainly not the case with us; for years rheumatism has not been a prominent disease in these parts, and yet the epidemic of diphtheria has been terribly severe. Rheumatism seldom attacks children under five years old. In our epidemic more children under five years had diphtheria than over that age. The majority of cases of rheumatism occur between the ages of 15 and 30. I have seen but a very few cases of diphtheria in persons over 15 years of age. Then in rheumatism we have the rheumatic diathesis, and it is often hereditary. Where is our diphtheretic diathesis and heredity? Rheumatism, though a very painful disease, is seldom fatal, though it may last for weeks and months. Diphtheria, not a painful disease, is very fatal, often proving so in a very few days. I fail to see the close alliance between diphtheria and rheumatism.

One feature in some of my cases was that the little patients did not complain much in any way, and were often up and dressed until a short time before death. I will give one case in point. August 2, 1880, call in the country to see a little Swede girl, five years old. Found my patient running around the house; tonsils and fauces heavily covered with membrane; glands of the neck much swollen; a profuse discharge from the

nose; very offensive breath; vomiting a little; no appetite; dull and congested countenance; pulse 120; bowels and kidneys reported normal by the parents. After prescribing for this patient, and going to my buggy, some fifteen rods from the house, I found, on looking round, my patient with half a dozen other children, at my heels. This child died in less than 48 hours, without obstruction to respiration.

This is not an exceptional case. Where children had the best of care and attention they often showed a disposition to be up and would play if allowed to. This occurred often in cases that run a rapid course and terminated fatally in five or six days. I frequently had much difficulty to convince my neighboring medical friends whom I called in, that these cases were in danger.

Other cases, however, were depressed from the first and the countenance had a dull leaden hue, the eyes were languid and expressionless, taking but little interest or notice of anything, but always answering when spoken to.

In discussing this subject I have aimed to give observations and symptoms and not theories. I have no pet theories to advance either as to the ætiology or treatment of diphtheria. I have no faith in the sulphites. I have used various atomizers with carbolic acid, sulphite of sodium, bi-carbonate of sodium, lime water, etc.; results not very satisfactory. Quinia and stimulants used often and early I do believe in. Monsell's solution with carbolic acid applied carefully to the membrane, I am sure is a good remedy, also cold water applied early to the neck. Chlorate of potassium I like, used in the first stages. Tincture chloride of iron in my hands has not come up to my expectations. I believe the best and surest remedy in the world is to keep the children entirely away from the disease.

April 30, 1881.

DR. VON NUSSBAUM, of Munich, has performed his three hundredth ovariotomy.—*British Medical Journal.*

SIR WILLIAM JENNER, K.C.B., F.R.S., was elected President of the Royal College of Physicians, April 11, in the room of Sir J. Risdon Bennett, M.D., F.R.S.—*Ibid.*

Society Reports.

ARTICLE IV.

THE CHICAGO BIOLOGICAL SOCIETY.

Stated meeting May 4, 1881. Dr. W. S. Haines, President, in the chair.

Dr. Roswell Park read a paper on the

SURGICAL ANATOMY OF THE SHEATHS OF THE PALMAR TENDONS.

Considering the frequency of injuries about the hands, one is disappointed to find how its anatomy has been poorly described by English anatomists. The best description of the Palmar Tendons has been written by Gosselin, and in this country by Connor, of Cincinnati.

After giving the anatomy of the tendons as commonly described, Dr. Park referred to the palmar bursa in which they glide. This bursa generally extends to the thumb and little finger, but the three other fingers have a bursa by themselves. This explains how phlegmonous inflammations of the thumb or little finger will rapidly extend through that synovial sac to the wrist and to the fore-arm. This bursa does not contain clear synovium, but cellular fibers also. It is best demonstrated by inflating it through its origin at the wrist. In some exceptional cases the thumb or the little finger have a separate bursa.

In cases of deep-seated inflammations in the hand, hot applications should be used, and as soon as suppuration has taken place the patient should be anæsthetized, the parts carefully dissected, cutting longitudinally over the middle of the metacarpal phalanges, and letting out the pus.

EXHIBITION OF SPECIMENS.

Dr. Park exhibited before the Society the various joints of the human body with all the ligaments attached, and perfectly flexible and odorless. They had stood exposed to the air for six months, and they were as soft and elastic as in fresh subjects. All the members present, some of whom were graduates of European colleges, admitted that they had never seen anything of the kind—it was a wonderful achievement in anatomical preparations. The sheaths of the tendons, with some of the flexor muscles, were preserved in the same manner. These preparations, at first perfectly white, had become yellowish-brown, but Dr. Park thought that was the only change that they could undergo, and that they would remain in the present state for years. His process of preparation was this:

The joints were dissected soon after death, then soaked in water for three weeks. They were now soaked in the following solution:

℞	Saltpetre.....	1 part.
	Sugar.....	2 parts.
	Glycerine.....	16 parts.

Methilic alcohol, enough to dissolve these ingredients.

Very little is used. After remaining a few weeks in that liquid, the joints were flexible and odorless. He had used benzine to destroy the fat in some cases.

Dr. Park had devoted many months to these researches, which will be highly satisfactory to every anatomist.

Dr. E. Fletcher Ingals read an abstract of a paper on

LARYNGEAL GROWTHS.

Up to twenty years ago, there had not been over seventy cases of this kind discovered, and those had, most of them, been found in the dead. But since that time thousands of cases had been found in the living. All sorts of tumors may be found in the larynx that are found elsewhere in the body, about in the following proportion: 75 per cent. are papillar growths, 25 per cent. fibrous, the rest were fibro-cellular, adenoid, etc., and malignant growths. It had been his misfortune to see more than his share

of this last class, for he had treated three cases, which will be found with the following:

Case I. A man 63 years of age had a fibroid tumor at the upper part of the trachea. Had experienced hoarseness for seven years. Had been worse for three months. Difficulty of speech and dyspnœa. The tumor was a large pyriform growth, pressing on the vocal cords, 8 mm. in diameter. Patient did not consent to an operation.

II. In the case of a physician, a small tumor had grown on the left ventricular band, the size of a split pea, hiding the left vocal cord. A first attempt at removal did not succeed. Another trial will soon be made.

III. A. B. A sessile papilloma on the lower surface of left vocal cord, 5 mm. in diameter. It was removed by McKinsie's forceps, and patient was cured.

IV. A man 69 years old. A growth was found in the larynx, which had caused hoarseness, severe dyspnœa, and other symptoms, for ten years. A small piece of the tumor had been removed and examined under the microscope. It was pronounced malignant. It was removed repeatedly during some weeks, but a large swelling formed in the arytenoid fold, which sloughed, but could not be removed. Patient refused to have tracheotomy performed. He died after a few days.

V. A female, æt. 25. Had had polypi in the larynx ten years ago in Germany, where a surgeon had removed them. A few months ago she had the sensation of a bolus in the throat. On examination a growth the size of a small pea was found attached to one of the vocal cords. It was destroyed by nitrate of silver. A larger tumor was also fouud in her larynx, and a part of it removed.

VI. M. E. Began to experience some dyspnœa some months ago. The vocal cords were congested. A pedunculated papillary growth ½ inch long hung in the sub-glottic space, having its point of attachment at the upper part of the posterior commissure of the vocal cord. It has not yet been removed.

VII. In this case a tumor the size of a pea had been removed from the right vocal cord, followed by perfect recovery.

VIII. A male, æt. 24, had had chronic laryngitis. Had

pleurisy three months ago. Had also had pneumonia and remittent fever. Patient was probably tubercular. A small papillary growth of the vocal cords was destroyed with carbolic acid and solution of morphia. Tannic acid and glycerine were also applied, and the nitrate of silver used. Inhalations of tr. of benzoine were given, and cod liver oil administered. The right lung was affected at the apex. Patient gained three pounds while under treatment. He afterward went to Texas, where he died suddenly three weeks ago.

IX. T. N., æt. fifty-nine, had complained of pain and dyspnœa for four months. A nodular growth 2 mm. in size was found attached to the right ventricular band, the vocal cords not being involved. It was not removed. Two months later ulceration of the throat took place, and Dr. Ingals saw the patient when he had been unable to swallow for ten days on account of regurgitation into the larynx. It was evidently a cancer. The suffering was great. The Doctor did not think excision of the larynx should be performed in such cases, and he had met a few other ones, because the life is not likely to be prolonged thereby. Dr. Ingals said that the removal of growths from the larynx is not painful, but that it is very uncomfortable to the patient. A warm compress was held around the neck for thirty-six hours after each operation, to prevent inflammation. There was no risk of tearing the vocal cords in removing small growths. He had been so unfortunate as to tear the healthy mucous membrane, where it was not intended, once, but no ill results occurred. Papilloma should not be removed where they seem harmless, because of their liability to turn into malignant growths.

X. A large malignant growth on the side of the larynx came under his observation. He has delayed its removal till now, because there will be hæmorrhage, which he will control with a peculiar electrode which he has contrived.

Dr. Ingals does not believe, as some do, that laryngeal growths depend on syphilis or tuberculosis. H. D. V.

ARTICLE V.

CHICAGO MEDICAL SOCIETY.

Stated meeting, May 2. Dr. E. Ingals, President, in the chair.

Dr. G. W. Earle read the paper of the evening on

ROETHELN, OR GERMAN MEASLES.

of which the following is an abstract:

"During the months of March and April we have been having a disease characterized by mild coryza, redness and suffusion of eyes, very slight fever, enlargement of the glands of the neck, followed with a papular eruption. These red spots are smaller than in measles and larger than in scarlet fever, and are entirely unlike variolous diseases. It is contagious, and in all its main features corresponds to what the Germans call Rötheln." Follows the history of twelve typical cases.

"Probably this disease is the one described as early as 1492 by Ali Abbas of Venice. As far back as the middle of the last century the German physicians wrote of an acute exanthem closely resembling this disease, and called it Rubeola. About that time the French and the English doctors called this disease Roseola. About half the authors and writers believe the disease under consideration to be either mild scarlatina, or measles, or both; and the other half believe it to be a separate affection. If this be an independent disease, as I believe it is, the first thing we want is a name.

"We should not call it Rötheln, because this is the name applied to Rubeola, and Rubeola is the name applied by many to measles. It is not roseola, for that is not contagious (the disease I am speaking about is certainly mildly contagious). It is manifestly improper to designate it German Measles, for this new progeny may first have seen the light on French or English soil.

ETIOLOGY.

"That this disease is both contagious and epidemic, I have no doubt. What is the contagious principle? We must say as we do in regard to scarlatina and measles, that we know nothing *per se* of this element. Of its predisposing causes we may be able to say something.

"*Its Relation to Miasmata.*—One observer has remarked that after great moisture, when the air is charged with impurities, the disease seems to prevail. The peculiar winter, from which we have emerged, may have had something to do as a cause of our present epidemic.

"*Incubation.*—This is from two and one-half to three weeks, according to Emminghaus. According to my experience, it is, with considerable regularity, seventeen days.

"*Age.*—More adults seem to be affected during our present epidemic than in those described by former writers. Infancy seems to be nearly exempt.

"*Social Position.*—The rich and poor alike seem to be liable to it.

SYMPTOMS AND HISTORY.

"Among children I have not been able to notice any prodromal period. In adults it is frequently present, and consists of languor, chilliness, pain in the muscles, surface of body feels flushed to patient, and in one of the cases a dizzy sensation has been experienced. In children, the first thing noticed will be the eruption, although in a few the eyes are somewhat red, and sneezing may precede the eruption. The coryza is not at all severe, and the conjunctival trouble has not in any of my cases except one amounted to photophobia.

"The pharynx is frequently red, not intensely so, and sometimes the redness is not diffused. The glands of the neck are swollen in about all the cases. The tonsils in one adult were considerably enlarged, and in one case a gland (the post auricular) was very largely swollen for days. The exanthem may be preceded a few hours by a redness of the forehead and cheeks—really an erythema—and then the spots make their appearance. I have noticed the eruption at first on the neck or chest, from which it spreads to other parts of the body.

"*Temperature.*—In the majority of cases it is normal. In a few cases, and especially in adults, when the pain in the head and pharynx is great, it is slightly increased. In one case it attained 104.

"*Pulse.*—The pulse in a patient seven years old, counted while I am dictating these words, is 90. Indeed, the symptoms

in children are so mild that they hardly ever take to their beds, and some boys do not discontinue their play out-doors.

"*Complications.*—Pneumonia has taken place in three or four cases in 120. Aphthæ has followed in a few cases, and rheumatism in two or three cases. It was very slight. There has been a tendency to gastro-intestinal irritation in a few cases. Pain in the bowels continued for several days in one patient. I think there is a decided tendency to urticaria, and in one or two cases a pemphigus has been noticed, which, however, remained only a few hours. Slight malarial troubles may, and frequently do complicate the disease, especially in this climate. I have noticed a slight furfuraceous detachment in a few cases, especially about the nose. There is no desquamation. Two *relapses* have occurred in my practice—one at the end of the third day, the other after twenty-one days. The relapse in this case was attended with considerable pain.

DIAGNOSIS.

"This is the most important question in regard to the whole subject. It is liable to be confounded with variola or varioloid, scarlatina, erythema, urticaria, rubeola, and roseola. Not a few cases have in this epidemic been taken for the erythematous or papular stage which sometimes is seen in *small-pox*. The want of severe head and back-ache, and the rapid disappearance of the eruption in a few hours, dispel any doubts of this character. The want of sore throat, the mild fever, the papular eruption instead of a rash differentiates it from *scarlatina*. In *measles* a severe bronchitis is invariably present for a few days, and there is a rise in the temperature from 102° to 104°; the eruption is about three days in spreading over the body, and when fully developed is much larger than in the disease we are considering. The coryza and photophobia are severe in measles; they are mild in this disease, whose incubation is from seventeen to twenty days, while it is nine days in measles. An erythematous blush is present, usually confined to a small area, as the forehead or one cheek. *Roseola*, more than any other disease, will give trouble in diagnosis. Roseola is said to be sometimes epidemic, but no one has claimed for it the element of contagion. Rötheln has a

period of incubation, and is markedly contagious. Roseola has a prodromal period. Rötheln has but few, if any, premonitory symptoms.

RECAPITULATION.

We have, then, a disease occupying about the same relation to measles and scarlatina that varicella does to the variolous diseases. It is a specific, acute exanthem, beginning by usually slight coryza and suffusion of the eyes, followed by a papular eruption, enlargement of cervical glands. The *treatment* should be conducted on general principles."

DISCUSSION.

Dr. F. M. Weller had seen some severe cases of this disease in Evanston in 1873. A few of them died. Dr. J. S. Jewell had seen the cases in consultation. A feature of his treatment was to expose a mixture of two parts of carbolic acid with one of camphor in a dish on the floor of the sick-room. He claimed this prevented the disease spreading to other members of the family.

Dr. G. C. Paoli said that, although he had seen several hundred cases of rötheln, he had never known one to die of that disease, and that cases of death could always be referred to scarlatina or some other disease present in the same locality. This disease had been described by Arabian authors long ago, but it was long before it was differentiated from scarlatina. A peculiarity of rötheln is that the eruption always commences on the face or forehead. The absence of of albuminuria would help the diagnosis in cases where scarlatina might be present.

Dr. Roswell Park is just now engaged in the management of more than a hundred cases in the Orphan Asylum, where the disease has occurred as an epidemic. An epidemic of measles had happened in the same institution a year ago. His observations agreed with those of Dr. Earle. But he had noticed that the eruption sometimes appeared first at the roof of the mouth. There was a mild sore throat in most of the cases; twenty per cent. had bronchitis; several had photophobia. He had not seen any cases of intestinal trouble. A young woman affected with rötheln had complained of pain in the legs and back. Perhaps

it depended on malaria. The spots of the eruption were a millimeter in diameter. Three or four cases exposed to cold had had pneumonia or severe bronchitis. He had not met any deaths. His treatment consisted of aconite, bromides to relieve the headache, laxatives when required, and co. syrup of squills to relieve the bronchitis. Most of his cases began as a bronchial trouble. The Society adjourned. H. D. V.

ARTICLE VI.

WEST CHICAGO MEDICAL SOCIETY.

Stated meeting, May 9. Dr. Norman Bridge, President, in the chair.

Mr. S. C. Stanton read an abstract of a paper on

NERVE STRETCHING,

by Drs. Lee and Fenger.

The operation had been first performed by Billroth, unintentionally, within the last decade, but Dr. von Nussbaum, of Munich, was the first to perform it for the relief of pain. It had now been tried all over the world, and in the following diseases: Idiopathic sciatica, secondary sciatica, neuralgia of the fifth pair, mimic spasms, neuralgia of the accessory nerve of Willis, nervous spasms of the extremities, epilepsy, traumatic paralysis, tetanus, and locomotor ataxia. Eight cases of nerve stretching in idiopathic sciatica were on record, almost all successful. The force exercised must be sufficient to cause a sensation of something giving way in the nerve. The force calculated to break the sciatic nerve was 130 pounds. In seven cases of secondary sciatica with disease of the spinal cord, the operation had failed in most of them.

Six successful cases in nine of neuralgia of the fifth pair had been recorded. The supra-orbital, the infra-orbital, and the inferior dental had been stretched. In eleven cases of neuralgia following injuries to various nerves, eight cures had resulted. Esmarch successfully stretched the nerves for the cure of neuralgia in stumps of amputated limbs. In five cases of mimic spasm, in which the nerve was stretched, the trouble disappeared. In

epilepsy, paralysis, and tetanus, the results were not very satisfactory. Of twenty-one cases of tetanus operated on, nine had recovered, and twelve died. Dr. Fenger remarked that a greater number of the successful cases had been recorded than of the failures; and we should not overlook the fact that in tetanus remedies had been administered also.

Nerve stretching should be done with antiseptic precautions, but the setting in of erysipelas, and the sloughing of the wound, which happened in a few cases, did not prevent the relief of pain in the nerves stretched. Taking everything into consideration, this operation is safer and more satisfactory than section or amputation of the nerves.

In some doubtful cases of locomotor ataxia, with pain, the latter had been relieved, and co-ordination returned. In one of these, Esmarch stretched the axillary nerves, and the locomotor ataxia disappeared. Only the painful nerves should be stretched. Two cases of anæsthetic leprosy, in seven, had been benefited. The modus operandi of that new surgical measure is very obscure, for a want of experiments on the lower animals.

As these various cases showed, the operation had given favorable results in a variety of wholly different diseases. There was no danger in its performance, no neuritis, nor any neuralgic pain had ever followed it. It is supposed that the axis cylinder of the nerves are disintegrated, and the nerve fibers have been found in a granular condition after stretching. Paralysis has followed in some cases.

Dr. Fenger said it was not impossible that after a number of years the present operation might be looked upon as a surgical curiosity, but as it was useful in many cases, and harmless at most, it should be tried extensively.

ELECTION OF OFFICERS.

Dr. H. M. Lyman, the founder of this society, was elected President, Dr. Mary G. Mergler Vice-President, and Dr. R. S. Hall was re-elected Secretary. Censors: Drs. Norman Bridge and E. L. Holmes. H. D. V.

Foreign Correspondence.

ARTICLE VII.

VIENNA, March 26, 1881.

EDITORS CHICAGO MEDICAL JOURNAL AND EXAMINER:—I sent you last month a description of the first successful resection of the stomach for cancer of the pylorus, performed Jan. 29, by Billroth. At that time the recovery of the patient, though probable, was by no means assured. The subsequent history of the case, however, has justified the most sanguine anticipations—not a single unfavorable symptom occurred; the patient was in two weeks discharged recovered, and has since remained quite well.

Encouraged by this success Billroth repeated the operation February 28, on a very anæmic woman, 39 years old, who had suffered from gastric derangement for seven months, and had presented the usual symptoms of commencing cancer of the pylorus during the previous seven weeks. In this case two difficulties were encountered which rendered the operation decidedly more formidable—first, a dilatation of the stomach, whereby the preliminary cleansing of the organ was rendered impossible; second, an adhesion of the stomach to the parietal peritoneum (as revealed by the exploratory incision) in consequence of ulceration and adhesive peritonitis. The operation was in general upon the same plan as the first, yet complicated by the sponging out of the gastric contents, and by the removal of the cancerous infiltration in the abdominal wall at the seat of ulceration from the stomach. The portion of stomach excised was 10 ctm. long and 6 wide—a medullary cancer. Fifty-eight stitches were made in the stomach and duodenum, the operation lasting two and three quarters hours. During the first day after the operation, ice only

was administered per orem, sour milk and ice the second day; nourishing clysters were given during the entire period. The patient vomited once on the second day, but on the third and succeeding days constantly. The stomach could be induced to retain nothing whatever more than three or four hours; the vomit contained acid, gastric juice and bile. As this condition of things, which Billroth ascribed, 1st, to a mechanical obstacle (knicking) to the passage of contents from the dilated stomach into the duodenum; and, 2d, to imperfect contractions of the stomach in consequence of dilatation and of adhesions to the abdominal wall at point of excision of latter, threatened to destroy the patient by inanition, Billroth decided to reopen the wound, a decision which he carried into execution on the seventh day after the operation. His fears were realized—a very sharp angle existed at the line of junction of the duodenum with the enormously dilated stomach, and adhesion existed with the diaphragm above as well as with the abdominal wall in front. Billroth sewed the edges of the stomach to the abdominal wall, and introduced a drainage-tube as large as the finger into the abdomen for purposes of nutrition. The patient died the next (8th) day of inanition. The section proved that no peritonitis had at any time existed.

On the 12th of March Billroth performed the third resection of the stomach, this time on a 36-year old cachectic woman. In order to avoid the danger of an angle at the point of junction, he sewed the duodenum to the stomach at a point low down on the greater curvature, hoping thus to facilitate the exit of the gastric contents. The value of this measure was not, however, ascertained, since the patient died twelve hours later of shock.

Although the present percentage is not very encouraging, Billroth is evidently determined to test the operation further, believing that as he learns the various modifications required in the operation by the various conditions of the organs concerned, a greater degree of success can be expected. After his return from his present vacation (about May 1) we shall probably hear of further cases.

WM. T. BELFIELD.

Domestic Correspondence.

ARTICLE VIII.

NEW YORK LETTER.

EDITORS CHICAGO JOURNAL AND EXAMINER:—I wrote in my last letter that the subject of mesmerism or trance had been assuming a good deal of prominence in various circles here. Of course the daily press takes up the matter, and makes as much sensation as possible out of a subject which contains plenty of material for exciting astonishment. There has been a good deal of exaggeration of the importance of this newly studied condition, but there have also been some uncalled-for attempts at ignoring it altogether. There can be no doubt of the reality of trance phenomena. Exactly how much they develop in ordinary life it is impossible yet to say. As far as the value of it to medical or surgical therapeutics is concerned, we may be quite sure it will amount to little in the hands of regular practitioners. We do know, however, that it is a powerful agent for effecting good and bad results with charlatans. I heard, only a little while ago, of a certain "doctor" who has an office on Sixth avenue, and who cures "by the laying on of hands." His method is to make the patient look fixedly at him while he makes certain passes over the head and face. He is reputed to have made many marvellous cures. During two hours in the morning he treats the poor, charging nothing. His office is then crowded with the credulous rich. Some time ago every one would have considered him not only an impostor, but one whose cures were all as imaginary as his pretensions were absurd. Now it can easily be understood that he probably does a good deal of his work by throwing the patients into a trance or trancoidal condition. The class of persons who visit him are just the kind that would be most sus-

ceptible. The methods employed by the "doctor" are also just those calculated to hypnotize the patients. This particular charlatan, therefore, only does what has been done here, experimentally, by regular practitioners.

Regarding the scientific value of trance, it is claimed that a study of it will throw much light upon some problems in physiology and psychology. One of the most interesting facts in connection with the former subject is the entire abolition of vertigo in the hypnotized subjects. Let any one fix his eye at a point on the ceiling; then turn around three or four times; then try to walk off in any direction. He will be sure either to stumble or fall. But hypnotize even an untrained subject, fix his attention on the ceiling in the same way, whirl him around, dehypnotize him at once, and he will walk off as steadily as any one could. Such an experiment certainly upsets some of the theories regarding the production of vertigo—particularly the one quite currently accepted, that it is produced in conditions like those above, by a movement of the endolymph in the semicircular canals, such movement exciting the auditory hairs that project into the fluid.

As regards psychology or physio-psychology, the promises of what a study of trance can contribute are still somewhat vague. There has recently been written a work, by Mr. Cyples, of London, containing some very elaborate studies of the methods by which the mind receives impressions and acquires experience. The work containing these studies has been indorsed as the best contribution to physio-psychology that has been made for many years. It is evident, however, that some of the conclusions of the author would have been modified, and some of his work improved, by a study of the curious phenomena of hypnotism.

I fear I am dwelling too long upon a subject that may not be thought worthy of so much attention. But I must add something in regard to the medico-legal relations of trance; for as far as one can tell now, this aspect of it is going to be the most important one.

At a meeting of the Medico-Legal Society, last April, Dr. W. H. Hammond introduced the subject of the possibility of persons, while in a trance state, doing criminal acts. He hypnotized

a young man, and then, by various suggestions, made him commit an imaginary theft, a murder, and a forgery.

The experiments were well conceived, but too much was claimed for them by their author. His assertions were received with much incredulity, and even the reality of the condition of trance was denied. Dr. Hammond did not, he says, have a fair opportunity to defend his views. At any rate, the discussion was postponed till the next meeting. At this subsequent meeting, which occurred early in the present month, Dr. G. M. Beard occupied most of the time in presenting his view of the matter, and especially his theory of trance. The paper presented was a very good one, in its place, but the author dwelt upon his own views of trance, to the exclusion, largely, of its medico-legal relations.

Dr. Beard was, I believe, the first in this country to study thoroughly the subject, and he has probably spent more time and thought upon the matter than any one else. His digressions, therefore, might easily have been excused. They were not, however, by all of his audience. An amusing incident was caused by Dr. E. C. Spitzka, a gentleman who terrorizes with his logic and erudition the various medical societies to which he belongs. He called the speaker to order, making the point that he (the speaker) was going over facts that were old, out of place, and not on the announced order of the evening. The president ruled that the point of order was not well taken, whereupon Dr. Spitzka took his hat and marched out of the room. Now that Conkling and Platt have resigned because they could not have their own way, it seems that our great men are getting petulant. Dr. Beard, in course of time, came to the medico-legal part of his subject, and stated that he did not think that persons in trance could go through any complex acts, criminal or otherwise. They were like machines, and would respond to a suggestion, but would act only upon that. They could do simple acts, like stabbing, shooting, and injuring themselves or others. They might perform a simple act of theft. Acts of adultery might be unconsciously performed, or a woman might be impressed with the idea that she had been violated, just as occasionally occurs in cases of the administration of chloroform. A few other medico-legal points were referred to briefly, but the subject was not well

brought out, and the subsequent discussion was very brief and of little importance.

Still, the matter has already got into the courts, not only in Paris, but in this country. The Whittaker case is asserted by Dr. Beard to be one of trance. This gentleman testified recently that the persons who mutilated Whittaker frightened him into a state of trance-coma, in which condition he was found. Other medical experts, such as Dr. L. C. Gray, have, to a certain extent, confirmed this opinion.

Any one would think, perhaps, from the local press of this city, that we were wading in garbage and cowering beneath the malign presence of half a dozen different pestilences. Our streets are rather dirty; we have some typhus fever, and rather more small-pox than usual. It is truly a disgrace that our streets are not cleaner, but the idea that the dirt in them is going to produce any violent epidemic is very extravagant. The mortality rate has not, on the whole, been much higher than usual, and has been lower than that of some other American cities. This would be especially true if the deaths of persons who have just reached the city—such as emigrants, or of transients in hospitals and elsewhere—were excluded. The cases of typhus fever are growing less, at date of writing, and the prospect is that the disease will die out. It has not been an easy thing to quarantine it, or to try and limit its spread. Thus, a short time ago, it came near infecting a whole infant asylum. A child was brought to the institution with the symptoms of scarlatina maligna. There was not much rash, but it had sore-throat, high fever, and great depression. The case was diagnosticated as one of scarlet fever, and, of course, put in the fever ward. Subsequent investigation, however, showed that it came from a house where two cases of typhus fever had been found. A closer study of the symptoms made it probable that the disease really was typhus. Fortunately, no one was infected. The present epidemic, indeed, has not been a severe one, as regards mortality or activity of infection.

Small-pox does not seem inclined to leave the city. The Board of Health has been very active in vaccinating the poor, and the vaccinating corps has done a great deal to limit the spread of the disease. Their work, this winter, has brought out a great deal

of evidence of the protective power of vaccination, including some actually crucial cases. I mention this because we have in this city a small number of fanatics who have organized themselves into an anti-vaccination society. I cannot find that many converts have been made. When small-pox leaves the city, doubtless the membership will begin to increase. I notice that the *North American Review*, with its usual skill in hitting off topics of present interest, has in its June issue a short article by Dr. Austin Flint, Sr., on "Vaccination." The article is a brief and unpretentious one, containing nothing especially new on the subject.

The Faculty of the Bellevue Hospital Medical College have, it is said, been made terribly sore by the numerous adverse criticisms in the medical journals upon its course in going back to a two-term system. But there does not seem to be anything that can be done about it. The school will probably in time recover what prestige it had. It certainly has, after all, only shown a little moral weakness. It is just as good a college as its neighbor, the University—which is not saying so very much, to be sure. Some apologetic remarks for the latter college were recently made by Dr. St. John Roosa. He said that an endowment was necessary for a three-term graded course, and stated that the Harvard Medical School was enabled to adopt its present system because it was thus endowed. To this an answer came promptly back from Harvard, that such was not the case at all; that the college was not endowed at all, and that the change had been made at a considerable pecuniary sacrifice.

There is a rumor that a new weekly medical journal is to be started in this city. It is at first to rival, and finally supplant, the *Medical Record*, which now leads the race. The *Record*, it is said, does not contain enough original articles of a high scientific standard. Doubtless the independent attitude of the *Record* towards the various medical colleges here has something to do with the movement. The colleges have their rings, and are mostly close corporations; and what is a ring or a corporation without an organ? It is further rumored that $25,000 has been subscribed for the object in question. It is not stated, however, that the money has been paid in. And when the actual amount

of work and money necessary for the conduct of a large weekly comes to be realized, the project will perhaps move more slowly.

Dr. L. A. Sayre has recently been indicted for malpractice. The plaintiff, a woman, alleges that Dr. Sayre gave her so much strychnine that it ruined her health. The case has not progressed very far yet, but it looks very much like one of blackmail.

Another interesting case recently in court was that of poisoning by a lemon meringue pie. Several persons who ate the pies made by a certain baker on a certain Saturday in October, 1879, were taken ill, with symptoms of gastro-intestinal irritation. One of the persons died, and the post-mortem showed that he had taken a corrosive poison. This was thought at first to be some salt of copper, produced by making the pie in copper kettles. Analysis showed, however, that there was no copper in the pie, but that there was a dye which stained wool yellow. This proved to be not the ordinary aniline yellow, which is probably innocuous, but dinitro-naphthol, a cheap yellow dye. This is the first case, probably, in which it has been found to have acted as a poison. The baker denied that he had put any dye in the pie, and it was not shown that he did it, or could have had any reason for doing it. However, the jury gave the plaintiff $1,000 damages. And persons who are fond of lemon meringue pies, if they go by the verdict, must look out for dinitro-naphthol in their dessert.

Our medical registration laws are now being tested, and, fortunately, the evidence in the two cases, or, at least, in one of them, is very strong. Two or three years ago, a man was called to account by the censors of the County Medical Society for practicing without any license. He then admitted that he had no degree, but protested against being interrupted in the pursuit of his living and the support of his family. Recently he has been caught trying to register his name as a regular practitioner, and claiming to have gotten his degree from the now defunct medical college at Castleton, Vt. The case is a clear one, and judgment was pronounced against him by the justice, but it has yet to be tested in the higher courts.

NEW YORK CITY, May 17, 1881.

Editorial.

We present to our readers with this number of the CHICAGO MEDICAL JOURNAL AND EXAMINER, a supplement of 100 pages, in which will be found a full report of the proceedings of the late meeting of the American Medical Association, collated in part from the daily edition of the Virginia Medical Monthly, the Editors of which deserve much credit for their efforts to publish daily full reports. This large addition to the cost of the Journal for the year and to the number of pages in the annual volume, is gained without any increase in the price of the Journal to our subscribers. The report, it is believed, is more full than any which has yet appeared, and we trust that this enterprise on the part of the editors and publishers will receive the appreciation which it is aimed to secure. We beg leave to remind our friends at this time, also, that we expect soon to present them with an excellent report of the transactions of the International Medical Congress, and that in our next issue we expect to report the proceedings of the Illinois State Medical Society, which is now in session in this city. No pains nor expense will be spared, in the future as in the past, to keep this Journal of Medicine in the forefront of all enterprises having in view the advancement of the interests of the profession.

Reviews and Book Notices.

ARTICLE IX.—THE MICROSCOPE AND MICROSCOPICAL TECHNOLOGY. A TEXT-BOOK FOR PHYSICIANS AND STUDENTS. By Heinrich Frey, Prof. of Medicine in the University of Zurich. Translated and Edited by Geo. Cutler, M.D. Illustrated with 388 wood engravings, 8vo, pp. 660. Cloth, $6.00. Wm. Wood & Co., New York.

To the student of Histology Prof. Frey is no stranger, and this work hardly requires an introduction. Ably written, it is well translated, almost too literally in places, but with a faithful regard for the author's meaning.

The cuts are numerous and truthful. We have chapters upon theory of the microscope; apparatus for measuring and drawing; tests; directions for using, preparing and mounting objects; directions for examination of blood, lymph, chyle, mucus and pus, and all the tissues normally and pathologically considered.

The chapter upon the urine and urinary apparatus is concise but clear. The Microscopical Examination is too briefly treated however, for a work intended for practitioners. A chapter could well be spared from elsewhere and devoted to this subject.

Following the index, which is exceedingly well arranged, are found the price-lists of the various instrument and objective makers, English, Continental and American.

ARTICEE X.—HOW TO SEE WITH THE MICROSCOPE. By J. Edward Smith, M. D. Illustrated. Pp. 410. Duncan Bros., Chicago. 1881.

In this volume we have, given in an informal and chatty way, a good deal of information about stands, objectives, and general manipulation. There are a number of catalogue illustrations,

not all bound in correctly however, for pages 40 and 69 should be transposed. These assist the reader about to purchase, and give a fair comparison of most of our American stands with each other, beginning with those of Zentmayer—who rightly occupies a leading position as regards years of service and merit of instruments—down to the stand devised and arranged by the author, "The Acme." A handy one enough it would seem. To him not supplied with a microscope we would say, read the volume before purchasing, as it may save expense and future regret. J. H. T.

ARTICLE XI.–A MANUAL OF JURISPRUDENCE. By Albert Swayne Taylor, M.D., F.R.S., Fellow Royal College of Physicians, Honorary Member of the Medico-Legal Society of New York, of the Société de Médecine Légale of Paris, etc., etc. Eighth American edition, from the tenth London edition, containing the author's latest notes made expressly for this edition; edited, with additional notes and references, by John J. Reese, M.D., Prof. of Medical Jurisprudence and Toxicology in the University of Pennsylvania, etc. With illustrations on wood. 8vo, pp. 934, half Russia, $6.50. Philadelphia: Henry C. Lea's Son & Co.; 1880.

The reputation of this book being so well established, all the reviewer can do is to recommend it to every student and practitioner as the best treatise on Medical Jurisprudence. It is practical and scientific, and a most valuable contribution to classical medicine. This new edition has been carefully revised and brought up to the present requirements of science. H. D. V.

ARTICLE XII.—THE BACTERIA. By Doctor Antoine Maguin, Licentiate of Natural Science, Chief of the Practical Labors in Natural Histology and the Faculty of Medicine of Lyons, etc. Translated by George M. Sternberg, M.D., Surgeon U. S. A. With illustrations. 8vo, cloth, pp. 228. Boston: Little, Brown & Co., 1880. Jansen, McClurg & Co., Chicago.

A beautiful monograph, illustrated with handsome photo-micrographs and lithographic plates. Bacteria have made such impression on the minds of scientific men; and some allied organisms, as *trichinæ*, bring on such a dreadful practical result, that

it is impossible for the physician to ignore them any longer. The present work is a necessary supplement to the best treatise on Botany, while half the book is devoted to the physiology of the subject. It should be found in the library of every practitioner of medicine. H. D. V.

ARTICLE XIII.—MEDICAL DIAGNOSIS WITH SPECIAL REFERENCE TO PRACTICAL MEDICINE. A Guide to the Knowledge and Discrimination of Diseases. By J. M. Da Costa, M.D., Professor of Practice of Medicine and of Clinical Medicine at the Jefferson Medical College, Philadelphia, etc. Illustrated with engravings on wood. Fifth edition; revised. 8vo, pp. 924. Cloth, $6.00. Philadelphia: J. B. Lippincott & Co. 1881. Jansen, McClurg & Co., Chicago.

Five editions of a work like this within sixteen years speak for themselves. Da Costa's has taken its place by the side of the best manuals used in this country, and is being translated into German. A careful study of this book will enable most young practitioners to make a clear diagnosis of, we may say, all their cases, and avoid the remorseful errors which might otherwise shake their faith in medicine, and blunt their energy forever. Diagnosis is the more important in our days, when law-suits for malpractice are so frequent, and the responsibility of the physician so great. H. D. V.

ARTICLE XIV.—SYPHILIS AND MARRIAGE. Lectures delivered at the St. Louis Hospital, Paris. By Alfred Fournier, Professeur de la Faculté de Médecin de Paris, Médecine de l'Hôpital St. Louis, Membre de l'Académie de Médecine. Translated by P. Albert Morrow, M.D., Physician to the Skin and Venereal Department, New York Dispensary; Member of the New York Dermatological Society; member of the New York Academy of Medicine. 8vo, cloth, pp. 252, $2.00. New York: D. Appleton & Co. 1881. Jansen, McClurg & Co., 117 and 119 State street, Chicago.

The Medical Press in this country and abroad have highly praised this work, which is in fact one that we all need. The views of the author are sound and reliable, and a better study of the subject could not have easily been achieved by any other

writer than Dr. Fournier. The translation is faithful, not only conveying the ideas and the facts, but even the style and the peculiarities of the French lecturer. This book, however, is better adapted for physicians than students, on account of the social bearings of the subject. H. D. V.

ARTICLE XV.—THE MANAGEMENT OF CHILDREN. By ANNIE M. HALE, M.D.

This little book contains much valuable information for mothers, for whom especially it was written. So many young women become mothers, and have the care of the physical and mental development of children before they know anything of the hygienic laws that should be carried out if they would give the little ones the best chances of life, that it is necessary they should have some one to appeal to beside the old ladies of the neighborhood. The first part of the book is devoted to the care of children in health, and treats of the following subjects: Food and Sleep; How to Dress Children; How and When they should be Bathed; The Importance of Fresh Air, Sunlight and Exercise; Indigestion. The second part contains a description of the most common diseases to which they are subject and the general symptoms by which the trivial diseases which need only a little domestic treatment, may be distinguished from the more serious ones which require the careful attention of a physician. We can recommend it to mothers, and venture to say if they were more familiar with its contents physicians would have fewer calls.

ARTICLE XVI.—A TEXT-BOOK OF THE PHYSIOLOGICAL CHEMISTRY OF THE ANIMAL BODY, INCLUDING AN ACCOUNT OF THE CHEMICAL CHANGES OCCURRING IN DISEASE. By ARTHUR GAMGEE, M.D., F.R.S., Professor in the Victoria University, Manchester; Brackenbury Professor of Physiology in the Owen's College. With Illustrations. Vol. I., 8vo, cloth, pp. 488; $4.50. London: Macmillan & Co., 1880. Jansen, McClurg & Co., Chicago.

The author's reputation is well established, and this work is certainly the best ever written on the subject; still it will suffice for any one to read a dozen pages of it in order to become con-

vinced that the best authors have only laid down the rudiments of physiology. However, this is probably the key to a better understanding of diseases and a more successful treatment. No earnest student, and no practitioner of medicine, whose philosophy extends beyond *similia similibus curantur*, can afford to be without any notion of physiological chemistry, and Dr. Gamgee has just complied with the requests of practitioners, the world over. The first volume contains the physiological chemistry of the elementary tissues of the organism, the blood, the changes which the blood undergoes in disease (a valuable chapter, but very incomplete), the lymph, chyle and transudations, pus, the connective tissues, the epithelial tissues, the contractile tissues, the nervous tissues, etc. A variety of apparatuses are figured in the text, and most of the experiments referred to are so well described as to facilitate their repetition by any student. We will wait anxiously the second volume, and recommend a careful study of this one, especially to those who are engaged in teaching chemistry, physiology, or pathology. H. D. V.

ARTICLE XVII.—RUMBOLD'S HYGIENE OF CATARRH.

We believe this the first book on catarrh which is devoted wholly to its hygienic treatment, but we also believe, with the author, that it is one of the most important points to be observed in its treatment. The author has made catarrh a special study for the last twenty years, and that he has been faithful and thorough in his study none can doubt who read his book. The first part of the book treats of Hygienic Measures. The importance of preventing colds. The care of the head—its protection day and night. He does not believe in shampooing, for it makes the scalp dry and the hair brittle, but thinks the hair should be oiled enough to keep it moist. The neck should not be bundled up with furs and comforters. Clothing should be thick in winter. Girls are more subject to catarrh than boys of the same age, because they are not warmly dressed, but the ratio changes when they become adults, for then boys take up the tobacco habit. Too frequent bathing and changing of underwear is a frequent cause of colds. The body, like the scalp, should be moist and not too dry. He describes the

"Catheter Nasal Douche," an instrument devised by himself, which, from the description and illustration, must be more effective in removing the crusts from the superior and posterior parts of the nasal cavities than any instrument yet invented. The jets of spray are thrown from the catheter in such a way that they must come in contact with the hard crusts that collect in those regions. We have not examined the instrument, but have no doubt of its usefulness. The Lucas Ear Injector, with his improvement, is a very convenient and ingenious instrument. The gutta percha ring which is molded to fit the outlet of the auditory canal prevents the escape of the fluid, except through the recurrent tube which conducts it into a vessel. The patient can use it himself and keep up a gentle continuous injection, without any danger to the membrana tympani. But one of the best chapters in the book is the one on the mental and physical effects of tobacco. We have suffered ourselves for several years from the injurious effects of the habit, and we can vouch for many of the facts stated. We believe it almost impossible to cure a patient of catarrh while he is continually using the weed. It is like attempting to cure the mucous patches of the mouth of a person with syphilis, who chews tobacco continually. In the fourth division of the chapter he says "the congestion occasioned by the action of tobacco on the mucous membrane of the superior portion of the respiratory tract resembles in many respects the congestion resulting from the effects of a cold, and, like it, some of its effects are transitory and some permanent." We can recommend this book to the profession, for the disease is so common in this climate and so hard to cure, it behooves us all to be as bright as possible on the subject.

ARTICLE XVIII.—THE BLACK ARTS IN MEDICINE, WITH ANNIVERSARY ADDRESS. By JOHN D. JACKSON, A.M., M.D. Edited by L. S. MCMURTRY, A.M., M.D., 12mo, pp. 74, cloth. Cincinnati: Robert Clarke & Co., 1880.

From time immemorial, the subject of the first part of this book has formed an interesting topic with medical men; for, although all physicians advertise, only the fool or the ignorant do it in the manner spoken of in this monograph. A great many ways are open to physicians to build their reputation: 1. Talents

and skill. Let a man prove himself a learned scholar, an eminent man of science; let him secure a professorship in a medical college, fullfil his position better than any body else could; let him become a favorite with his colleagues, and soon his reputation will extend to the whole community. Then let him write some classical work on some branch of medicine, and his reputation is built and advertised for life. This is a very commendable way of advertising. 2. Honesty and social position. It is in the nature of our vocation to be sociable, honest, reliable citizens, and he who possesses these merits cannot fail to command a large practice wherever he becomes known. It is a subject of grief for the profession at large to be so little represented in politics, religion, or industry, and a large source of income is cut off from its members on that account. Even mental income, if we so style the expansion which the mind receives from a daily contact with all the most important facts of political economy. So much so that we have all met bright young men cheerfully entering the career of medicine, full of energy and vigor, who were soon complete wrecks, so quaint and modeled by prejudices was the profession in the places where they began practice. 3. Professional men must be universal in their knowledge. Lack of this is a great drawback to many practitioners who never studied anything but what is taught in common schools, took two courses of lectures in a medical college, and set to practice. Some of these are remarkable for their ignorance, especially of anything beyond their materia medica, and the routine of practice, and the medical profession, on their account, is looked upon as something insignificant and of doubtful merit.

Let us all advance our standard in these various directions, and the people at large will soon learn to whom to apply for reliable medical attendance, and their money will not be wasted on quacks as much as it is now. Many deficiencies stand in opposition to these views. Indolence on the part of some able men who could assume and fill higher positions; a lack of business in many famous physicians, who engage in ruinous competition with younger members by charging the lowest fees; and last, not least, a sort of ostracism to which most physicians willfully submit. H. D. V.

Summary.

Collaborators:

DR. L. W. CASE, DR. R. TILLEY,
DR. BYRON W. GRIFFIN, DR. W. L. DORLAND,
DR. H. D. VALIN.

QUARTERLY ABSTRACT OF OPHTHALMOLOGICAL AND OTOLOGICAL LITERATURE.* By Dr. E. J. GARDINER, Chicago.

THE APPLICATION OF ELECTROLYSIS IN OPHTHALMIC THERAPEUTICS. By A. Nieden, M.D., of Bochum.—(*Arch. of Opth., Vol.* X., *No.* 1.)

N. highly recommends the use of electrolysis in the treatment of angioma of the lids, and reports several cases cured by its application. The portable, constant apparatus made by Krüger, of Berlin, after the model Spamer, was used. The needle of the positive pole should be made of platinum, steel needles having the disagreeable feature of becoming rapidly oxidized, and discoloring the tissues by the intermingling of the products of oxidation with them. "The needles are inserted at the places appearing most desirable for the first attack; in small tumors, one for each pole; in larger ones, two or more for the negative pole." His results have been very satisfactory.

CONTRIBUTIONS TO THE KNOWLEDGE OF THE CONGENITAL DISPLACEMEMT OF THE LENS. By Dr. H. E. D'Oench, of St. Louis.—(*Arch. of Oph., Vol.* X., *No.* 1.)

After reporting the case of a girl, eight years old, in whose right eye there was found congenital dislocation of the lens, out-

* Authors are requested to send a re-print of their papers, or the number of the journal in which they appear, to Dr. E. J. Gardiner, 170 State st., Chicago, Ill.

ward and slightly upward, and in the left eye almost exactly outward; and, after reviewing the literature on the subject, D'O. arrives at the following conclusions:

1. Ectopia of the lens is a malformation, the causes of which, thus far, remain unknown.

2. It always affects both eyes, generally in a symmetrical manner.

3. The direction of the displacement is almost always either upward, upward and inward, or upward and outward.

4. The lenses are generally transparent; sometimes their size is below the mean.

5. The suspensory ligament is sometimes found, sometimes not.

6. In about one-fourth of all cases, there is myopia.

7. The position of the lenses may remain unchanged throughout life, but spontaneous dislocation may also result.

8. Heredity has been proven.

"ON QUININE AMAUROSIS." By Dr. E. Gruening, New York. —(*Arch. of Oph., Vol.* X., *No.* 1.)

G. reports in detail the case of a lady (age thirty-five) who, after taking 80 grs. of quinine in thirty hours (10 gr. doses), was seized with a convulsive fit. When the attack had passed, the patient was found to be totally deaf and blind. Twenty-four hours after the attack, hearing was partially recovered, but total blindness persisted for one month, when she began to distinguish light. From this time (July 19) V. gradually improved until Sept. 23rd, when with + 3 D. her V.=$\frac{20}{20}$, and reads Snellen $1\frac{1}{2}$. "Her fields of vision were concentrically limited." On Snellen's color-chart no colors are recognized. On Dec. 28, the four fundamental colors were perceived. After excluding all causal elements known to bring on temporary amaurosis without appreciable retinal lesions, G. concludes that, "On reviewing the unequivocal cases of quinine poisoning with amaurosis (Roosa, Wecker, Voorhies, Gruening), we find a remarkable congruence in their essential features." "The patient, after the ingestion of a single dose, or of repeated doses of quinine, in varying quan-

tities, suddenly becomes totally blind and deaf. While the deafness disappears within twenty-four hours, the blindness remains permanent as regards peripheric vision, central vision gradually returning to the normal after some days, weeks or months. The ophthalmoscope reveals an ischæmia of the retinal arteries and veins, without any inflammatory changes."

"In view of the constancy of these symptoms, and the uniformity of the ophthalmoscopic picture, we are entitled to demand for this type of amaurosis a recognized position in the pathology of the optic nerve and the retina."

AMBLYOPIA FROM DISUSE. By Dr. E. Williams.—(*Cin. Lan. and Clin.*)

W. advises tenotomy as soon as the strabismus is a "fixed thing," in order to save the sight of the eye, with faulty fixation. In support of the theory of amblyopia from disuse, he reports the case of a man of sixty-three years, who in boyhood had been operated upon for convergent strabismus. The effect had been excessive, the result being a very unsightly divergence, with a great insufficiency of the interni. He had learned to fix exclusively with his right eye; the left was defective in vision from "disuse, previous amblyopia, or both." Suddenly a large hæmorrhage occurred in the region of the macula of the right eye, which reduced his formerly good V to $\frac{3}{200}$. The habit of fixing with his right eye adhered to him, and when he looked with it he saw but little; when this eye was closed, and he could fix with his left eye, he saw much better. On uncovering the right eye, he involuntarily fixed with it; the left eye diverged, he suppressed the image, and was left in obscurity. By months of patient practice, he has acquired control over the muscles of his left eye, and now fixes with it. The eye was hypermetropic $\frac{1}{14}$, with +14 V=$\frac{15}{40}$; six weeks later, V=$\frac{20}{30}$. He yet sees badly at night, and can only read for a few moments at a time.

CONTRIBUTIONS TO THE STATISTICS OF MYOPIA. By Dr. O. Just, of Zittau, Saxony.

In order to ascertain whether the bad hygienic conditions of schools were the sole cause of myopia in children, J. examined

seven classes of the two new High Schools of Zittau, in both of which the hygienic conditions of light, space and arrangements left nothing to be desired. Not finding the percentage decreased, he concludes that "myopia being as frequent in the new schools of Zitttau as in other educational institutions of the same kind, we may fairly conclude that it does not chiefly result from insufficient illumination of the school rooms, but rather from the great and ever-increasing demands on the industry of the pupils at home, forcing prolonged labor on their eyes during the evening hours, frequently by insufficient artificial light."

J. does not underate the dangers of bad sanitary conditions in school rooms, but urges the necessity to disencumber children's eyes of as much evening work as possible.

"DE L'AMBLYOPIE ALCOOLIQUE." By Dr. H. Romiee (de Liège).—(*Rec. D'Oph.*, Jan., 1881.)

R. considers this disease much more common than it is supposed to be. Among the most prominent symptoms he mentions the loss of accommodative power, which ranges from slight "weakness" all the way to total paralysis. *Vision* rapidly diminishes, terminating in complete blindness.

Color perception diminishes from the center (central scotoma), and gradually attains the periphery. *Ophthalmoscope.*—The changes in the fundus are limited to the optic nerve, the modifications of which he resumes in: (*a*) hyperæmia, (*b*) a characteristic white appearance of the papilla, (*c*) gray atrophy. After stating the general symptoms and treatment, he reports several very interesting cases.

PYÆMIA FOLLOWING A MASTOID ABSCESS, Treated without Medicine. Recovery. By E. F. Ely, New York.—(*Arch. of Ot.*, *Vol.* X., *No.* 1.)

E. gives in detail a case in which, after chronic suppuration of both middle ears for many years, a mastoid abscess formed on the right side. Wilde's incision was made, and after considerable trouble a soft spot in the bone was detected. The fistula was enlarged, a poultice applied, hot douche ordered to be used. The patient apparently improved, and was considered out of

danger, when suddenly, on the sixth day after the operation, he had a chill, and the temperature at 9 A. M. was 104½°. For eleven days the patient presented well-marked symptoms of pyæmia. Both the author and Dr. Roosa gave a very unfavorable prognosis to the family. During this illness no medicine was administered. "Aside from the matter of drugs, this boy, of course, had a great deal of medical treatment, in the best sense of the words. He had a quiet room to himself, with an open fire. . . . Good nursing. . . . I visited him often myself, and every small detail regarding food, stimulants, dressings, etc., received thoughtful consideration. . . . Food was well born during the entire period. . . The diet consisted of milk, to which was added a little sherry wine at first, and afterward a little whisky. Poultices were kept applied over the jugular vein and upon the painful swelling over the left sterno-clavicular joint."

"Jan. 31.—Pains and tenderness along each clavicle. A red and tender swelling, about the size of a walnut, has appeared over the left sterno-clavicular articulation. Distinct sense of fluctuation."

"Feb. 12.—There were no unfavorable symptoms after this date. . . . He went out, Feb. 26 (thirty-six days after operation). Free discharge from mastoid, fistula and ear."

"THE COTTON PELLET AS AN ARTIFICIAL DRUM HEAD." By Dr. H. Knapp, New York.—(*Arch. of Ot., Vol.* X., *No.* 1.)

After giving a short historical review of the artificial drum head, K. reports four cases in which its application rendered decided services to the patient. In Case I, a lady of forty-one, who had copious and offensive discharge following scarlet fever, and who at the age of twelve was so deaf as to necessitate people to speak loud directly into her ears, was treated by Dr. F. A. Cadwell, who put cotton pellets into her ears. He attended her himself until the discharge had almost disappeared. "Since then (29 years) she has worn the cotton pellets, and by their aid has always enjoyed good hearing, and has been free from pain and inflammation." At present, without the pellets, she understands conversation at the distance of a few feet—with them at

twenty. In Cases II, III, and IV, the results obtained were also excellent. The points which Dr. K. desires to make in regard to the use of the cotton pellets are summarized in the following statements quoted from his article:

1. "Cotton pellets, moistened with glycerine and water (1:4), and worn as artificial drum-heads, are a great aid to hearing in many cases of partial or total defect of the natural drum-head, with or without otorrhœa."

2. "Their therapeutical action in arresting profuse discharge on the one hand, and preventing the mucous membrane of the drum cavity from drying up, on the other, is most valuable."

3. "They protect, like natural drum-heads, the deeper parts of the ear against injurious influences of the atmosphere."

4. "In some cases they are quite indispensable, and may be worn for a lifetime with permanent comfort and benefit."

5. "In other cases they are needed only periodically, according to the copiousness of the discharge, or the exsiccation of the mucous membrane requires their action, in the one or other direction."

6. "The period during which a pellet may be left in the ear varies with the condition of the parts. They should be changed frequently—*i. e.*, every day, or every few days, so long as the discharge is considerable. They should not be worn at all when the discharge is abundant and offensive. When there is no discharge they may be left in as long as they are comfortable and the hearing is good. So far as my experience goes, they are apt to become unclean in a week or two. They then ought to be removed, the ear cleansed, either with dry cotton, or cotton steeped in warm soap-suds, and new pellets introduced."

7. "The management of the ear disease should remain in the hands of the physician until a stationary condition, either of slight or no discharge, has been reached. During the time the patient is under treatment, he can be taught how to cleanse his ear, and remove and replace the pellets."

PRACTICAL MEDICINE.

CATARRHAL DIATHESIS IN YOUNG GIRLS.

A special state of the organism has been demonstrated, constituting what we call a *catarrhal diathesis*. We observe in a certain number of young girls, even in very early youth, general impairments of health which plainly call for that term. This peculiar form of catarrh, which often came under my observation at Mont-Dore, is in reality a constitutional affection, and is, in all the extent of the term, a diathesis. Besides, it is not fully inherited, but it is connected with dispositions or tendencies which visibly depend on the constitutions of the parents.

Etiology.—Two facts must be considered in this respect: the health of the parents, and the hygienic surroundings of the girl. (1). Most always, the parents suffer from what we generally call a delicate constitution, a constitutional weakness, and suffer from some catarrhal affection, or die young. In many cases, they even show symptoms of adenitis, scrofulosis, or phthisis. (2). As a general rule, these young girls have been exposed to cold and dampness, either in their homes, or under exposure to the influences of a cold climate.

Symptoms.—These girls have often a light complexion, are pale, and their flesh is soft; they easily take cold, and they sometimes have what we call a *fatty chest* (an increased secretion of mucus in the respiratory passages). Although, excluding cases of more or less acute affections of the bronchi, auscultation reveals no important change, sometimes none at all. The digestive functions are often irregular. The general growth of the body is slow and labored, as it were. The girl is said to have a delicate constitution; her menses set in late; and, in many cases, the most important point is, an abundant leucorrhœa, very weakening, which may have started in early infancy.

As might be inferred from what precedes, the nervous element is found a good deal in the catarrhal diathesis of young girls. It is manifested by pains in various parts of the chest, by chokings, which take place without adequate causes, by the erratic and changeable character of the symptoms, by the frequency, obstinacy and the character of the cough, notwithstanding the negative

results of physical examinations; by an abundance of expectoration, alternating or existing simultaneously with a profuse leucorrhœa. To conclude, these profuse losses from the bronchi, or from the genital passages, finally ruin the constitution.

This diathesis, we are happy to say, is capable of being cured, by an intelligent observation of the laws of hygiene, by an appropriate treatment; and age may also bring a cure.—Abstract from an Address of Dr. G. Richelot, in *L' Union Médicale*, March 3.

THE editor of the *Journal of Comparative Mèdicine* desires to secure as complete a list as possible of all persons practicing Veterinary Medicine in this country. No Veterinary Medical Register now exists. It would tend to unite members of the veterinary profession, and benefit them in many ways, and would be a convenience to many others, if such a register were published. All veterinarians are urgently requested to forward by postal, their names, titles and addresses. All such will receive a copy of the final list at cost rates. Address, Editor of Journal of Comparative Medicine, care W. P. Hyde & Co., 22 Union Square, New York City, N. Y.

SMALL POX AT BOULOGNE.—The small-pox statistics at Boulogne-sur-Mer during the months of January, February, and March are as follows: In the town and at the hospital there were 157 deaths, 94 of which were children. The disease has been of a virulent form, but the numbers have decreased during the last month. Over 1,600 people have been vaccinated from the calf, four having been placed at the disposal of the medical men of the town; and at a meeting of the Medical Society, April 5, it was decided to continue the vaccination, each medical man taking his turn at the work. On the morning of the 11th of April, there were only eight cases at the hospital, all going on well.

Selections.

THE PHYSICIAN'S LEISURE; A PLEA FOR THE STUDY OF ARCHÆOLOGY. By Dr. CHEVERS. (Continued from p. 548, May, 1881.)

The ancients had their air-tight dressings, ruder than the appliances of the antiseptic method, but useful in the same direction. Wadd tells us of an empiric who professed that he had a radical cure for inguinal hernia. He used to remove the testicle and throw it to his dog, and then to secure the cord with a sow-gelder's clamp in such a manner as, possibly, to set up inflammation in the inguinal canal, and to close it against the descent of the hernia, providing the patient did not die. This wretch rudely anticipated an operation which modern science has almost perfected. In John Hunter's time and long afterwards, broad ligatures or narrow tapes were used in tying arteries. I had the honor of knowing, in his retirement at Kensington, Dr. Veitch, a naval surgeon, who first proposed the thin round silk ligature—certainly one of the most daring and remarkable discoveries ever made in surgery. "How," common-place people must have exclaimed, "is a great artery to be closed by suddenly cutting through its inner and middle coats?" And so it has been that, for the last seventy years, no one has amputated a limb or deligated a main artery without dreading hæmorrhage should the ligature separate too early. Now again, Mr. Barwell has introduced a most ingenious modification of the broad ligature. His "flat ligature," which compresses the artery but does not divide its coats, has been employed with great success.

The palæontologist and anthropologist search with true antiquarian feeling, in the caverns and pits of Britain, for the

remains of the bear, the wolf, the wild-boar, the hippopotamus, and rhinoceros, and delve in the barrows which stud our English downs for the skulls and weapons, and ornaments of our brachy-cephalic and dolicho-cephalic ancestors. Others explore the mosses of Waterford and the Isle of Man for the skeletons of the extinct gigantic elk (*Magaceros Hibernicus*), and the icebergs of Spitzbergen for the frozen bodies of the mammoths of the glacial period. At home we view with interest the *Bos primigenius*, the only pure, but degenerate, representative of the aboriginal gigantic cattle of our island, still to be found at Hamilton, Chillingham, and Chartley. When duty compels us to labor in distant colonies, we reconstruct the bird dodo of the Mauritius, and the dinornis and apteryx of New Zealand, and we discover living types of the fossil iguanodons and crocodilians of the oolite in the go-samp of the East and the guano of the West Indies, and in the garials, representing the genera Steneosaurus and Teliosaurus, at which griffs throw pot-shots, usually ineffectually, as the boats stem up against the tide of the Ganges and Brahmapootra. The zoologist observes that the edible snail (*Helix pomatia*), cultivated by the Roman colonists in Britain more than nine centuries ago, as freely as snails are eaten in Paris at this moment, is still so often to be found in the vicinity of Roman settlements, that its discovery in any given locality encourages the antiquary to search its habitat for the buried remains of Roman mansions.

So the botanist wonders over the mummy wheat and the mummy pea of Egypt, preserved in life among the cerements of the embalmed dead since the time of the exodus. He notices a fact of similar interest in this passage from Aubrey's Natural History of Wiltshire: "The spring after the conflagration at London, all the ruins were overgrown with an herbe or two, but especially one with a yellow flower; and on the south side of St. Paul's Church it grew as thick as could be; nay, on the very top of the tower. The herbalists call it *Ericolevis Neapolitana*, small bank cresses of Naples; which plant Tho. Willis" [the anatomist and physician, from whom the circle of Willis has its designation] "told me he knew before but in one place about the town; and that was at Battle Bridge, by the Pindar of Wakefield, and that in no great quantity." Again the same conservative spirit in

Nature, in now hoarding up and now spreading abroad buried germs of useful plants for man's benefit, is illustrated by a fact mentioned to me by my friend Sir Joseph Fayrer, and lately cited in My Notes on the Diseases of India, that, after the incessant cannonade of the enemy had crumbled to dust much of the frail defenses which surrounded the Residency at Lucknow, the wild spinach of India (*sag*), a useful antiscorbutic, sprang up from the *débris* of pulverized brickwork, and was brought in by our soldiers, under fire, and sold, weight for weight against rupees, to the officers, who bought it for their wives and children perishing from scurvy. We were told, a few years ago, that red roses still flourish wildly where so much Lancastrian blood was poured out four hundred years ago, on the field of Towton. The Scottish thistle, doubtless planted by the attendants of Mary Stuart, still flourishes on the site of Fotheringhay, although not one stone of that great ducal fortalice remains upon another; and it is a well-known fact, in the North, that the line of the Roman wall is peculiarly rich in those medicinal plants which were used by the Roman physicians.

The geologist, the botanist, and the zoologist naturally and readily become antiquaries. Their work requires that they should visit the remotest and least frequented districts; and, while they examine the structure of the rocks or the flora and fauna of each locality, they readily observe and perhaps discover antiquities which time has hidden from eyes less practiced. Thus it is that, in our own time, Nilson, the zoölogist, has taken a foremost place among northern archæologists.

The chemist must have a very unlearned knowledge of his science if he cannot give the history of his predecessors, the alchemists,—Raimond Lully, Basil Valentine, who discovered the medical uses of antimony, and Paracelsus; and unless he can show how chemistry was developed by Boyle, Cavendish, Lavoisier, Priestly, and Davy.

Many medical men, like Charles Patin, the numismatist, Sir Thomas Brown, Dr. William Stukeley, and Professor Simpson, whose memory is still fresh wherever medicine is valued in its highest scientific aspects, were eminent antiquaries—that faculty which enables a man to discover how to read the inscription on a

coin which time has rendered, to all appearance, perfectly flat, by placing it on a plate of red-hot metal, being nearly akin to that power of cultivated observation by which the mysteries of pathological action are investigated and interpreted. Chief among modern archæologists is to be named a gentleman long a general practitioner in the city, in the center of the remains of Roman London. Encouraging the mud-larks of the river Thames, and the laborers who dug the sewers and laid down the gas mains, he gradually collected from the river shingle, from the bed of the ancient Wall-Brook, by the Mansion House, and from the dust pits of the city of the Proconsuls, so rich a store of Samian ware, such a variety of ornaments, so many works of art, statuary, tesselated pavements, sarcophagi, utensils, and weapons, that Roman London was virtually re-discovered by his researches, and lives again, at the Guildhall, after fifteen centuries of obliteration, in the collections of Charles Roach Smith.

What a solace may archæology become to the perhaps not extremely successful country doctor who has within him a scintilla of real antiquarian feeling! His daily round, perhaps through mile after mile of the bleakest, barest, ugliest country in the realm, becomes to him a course of never failing interest. We will say that it is nearly all down or moorland, without a grove or a single stately tree to afford it shade or to relieve its blankness, or one babbling stream or pleasant waterfall to give it life and freshness. And yet how full of interest it is to him! Yonder hideous church tower is nearly unique as an unrestored specimen of well authenticated Saxon architecture. In the churchyard is a rude stone cross, the inscription on which he has been enabled to read by aid of the Runic alphabet in his Penny Cyclopædia. The stump on this knoll by the wayside shows where Hardriding Rob, the highwayman, was gibbeted in chains. That shapeless mass of coarse stone rubble, traversed with bright red sections of baked tiles, is one of the *vestigia* of a Roman city which lies buried here, and from the confines of which the country folk often bring him relics, of which he alone, in that neighborhood, knows the true import and historic value, ranging from the invasion of Claudius and throughout the four hundred years of Roman occupation until the last trireme left our shores. From

this old chalk-pit the diggers (he is not to be imposed upon by the Stone Jacks who manufacture these relics) procure him and sell him for copper those palæolithic and neolithic flint spear heads, arrow heads, and hatchets, his collection of which is beginning to obtain celebrity. Across that valley is a British earthwork, and upon it the still distinctly bared cutting of a gigantic human figure, most clearly defined when rain has fallen and the tender grass springs up along its outline. In this, enclosed within strong hurdles, the Druids used to sacrifice human captives by the hecatomb. Out there are Celtic barrows in all their varieties of form, the long and the conical, the twin barrow and the Druid barrow, the burial places of prehistoric chieftains. Just here was fought one of the grimmest battles of the Wars of the Roses. See how bravely the corn waves where the dead lie thickest, and where, as lately happened in the "Bloody Meadow" battle-field at Tewkesbury, the teeth of the flower of England are brought to light wherever the plowshare passes. On the green sward, a little farther on, once a Roman *cursus*, one of Rupert's fiery charges broke a squadron of ironsides as a gust of east wind scatters the thistle-down.

The museum of the nearest city, so much indebted as it is to his knowledge and contributions, is, to him, a place of delightful resort. The sight of a new number of *Notes and Queries*, containing his reply to a long debated question, upon his study table when he returns at night, almost worn out by toil, to which disappointment has perhaps added tenfold weariness, seems to renew the life within him; and the occasional festival of the Archælogical Society, of which he is an active member and the chief local cicerone and expositor, affords him unalloyed delight.

Some matter-of-fact hearers may say—"All this is very well, by way of amusement, to the few who care for such old-world matters; but you have described to us a mere unpractical Dry-as-Dust who wastes his time and his money in desultory ramblings and earth grubbings which bring him and his patients no valid and substantially useful return. It is not so. His leisure is pleasantly and, at the very least, harmlessly occupied; utter weariness of the toils and troubles of life is not permitted to eat his soul up; and, for the rest, the people respect him for his great

earnestness, his strange knowledge, and his pure life; and his intercourse with the clergy and squirearchy of his district is rendered safe and pleasant by their recognition of the fact that their medical attendant, whose professional knowledge they have no power of gauging, is undoubtedly a gentleman of refined and scholarly tastes. Let me repeat—Your patients have, for the most part, very little notion as to whether you are or are not competent physicians and surgeons. In this respect any impudent quack will often strike and attract the laity more than you will ever succeed in doing. But you will fail in your duty to yourselves and your profession if you do not take honest, unostentatious means to acquaint the society into which you are thrown that you are well educated men of cultivated intelligence.

Here I must offer a caution which, with some, will condemn my main argument. However praiseworthy and useful the occupations of the physician's leisure may be in themselves, he must pursue them with some caution, I will not say secresy, at least until his professional reputation is fully established. The enemy readily discover a weak point; any gibe that stings a rival will serve in turn. It was said of a student who went in for the prize in medicine, "We must either give the medal to him or give him nothing." "Well, he shall have the latter,—he is a *bookish* man." I knew a surgeon who fell very little short of greatness, who failed in life because he had become branded with the name of "pathologist." It must not be charged against us that we sacrifice our duty to our amusements or even to our special studies. "Dr. ——," said a patient, "is probably too much engaged in his literary pursuits to afford proper attention to the sick." John Bell's remark upon his brother and superior, Sir Charles, is alleged to have been, "The body draws." I was present when it was proposed, but not seconded, in our municipality at ——, that the city surveyor, an exemplary officer, but an admirable amateur photographer, should be ordered to give over taking sun-pictures. But this difficulty attends nearly all visible and active amusements, and he is unfit for our profession who is not both discreet and moderate.

To myself, a strong, but, I trust, not ill-regulated, love for antiquarian reading has (to say little of the rest and gratification

which it has given in an active career in which ordinary "amusement" has obtained no part at all) afforded me great and valid assistance as a professor of medicine, as a hospital physician, and as an investigator and writer in the subjects of pathology, public hygiene, and medical jurisprudence, for research in which India affords an admirable field. In all my subjects of study, old books yielded me endless lessons. Let us take one of these. Throughout that web which forms the etiology of most of the prevailing diseases, not only of India, but also of England, run two threads of pathological influence, by the accurate tracing of which the physician can often alone hope to unravel the mesh in which his patients are enveloped. These two factors are the marsh poison and scorbutus. What modern physician, of English training, can efficiently cope with these most insidious and tenacious constitutional taints unless he has paid close attention to history? He can have seen very little pure and unmasked malarious fever in the city hospital where he studied; but, at this moment, there are plenty of marshes and bad food in the United Kingdom; and history tells him that, in ancient times, marsh disease swept down the haughtiest heads of England's royalty and nobility. Henry of Agincourt, Wolsey, Walter Devereux, Lord Deputy of Ireland, and a host of other distinguished persons, died of dysentery or some cognate disease. Mary of England, Cardinal Pole, James the First, Cromwell, and Charles the Second died of marsh fever. In fact, it is a truth, albeit a quaint one, that the Reformation was, validly, the first great step in the march of sanitary reform in England. It led to the filling up of the moats and stews, fish ponds and lakes, which furnished diet for fast-days, and which maintained a constant supply of paludal poison at the very door of every country house in England, as the tank or water pit now does beside each hovel in Bengal. Again, who, although he may have worked for years in a seaman's hospital, either in this country or in India, can know much of fully developed scurvy unless he has pondered over the miserable but invaluable lesson afforded by the narrative of Anson's voyage, and has made himself thoroughly acquainted with sea scurvey as its every phase is delineated in the now antiquated pages of Lind and Trotter? Land scurvy is present nearly everywhere among the poor, and often

among the rich, in India; and it and the marsh poison should never be entirely out of the mind of the physician who practices in London, one of the worst placed cities in the world, where the combined effects of these two deadly influences are daily seen in purpura, anæmia, sloughing phagedæna, cancrum oris, carbuncle, dysentery, and splenic enlargement.

Still again, who can take a large view of diphtheria, typhus, and the true enteric fever of Jenner, unless he knows well the history of their great predecessor, the Plague, which appeared nearly every year in filthy, overcrowded, ill drained London, and heaped up fathoms of dead in the monstrous plague pits (one of which lies within a few paces of the spot upon which we now stand), until that grand but rather costly sanitary measure, the Great Fire of 1666, only improved matters in degree, leaving in the Plague's track the scarcely less insidious and mortal diseases which I have just named; and also, as I fully believe, still leaving this improved but very insanitary city fully open to attacks of plague whenever the pestilential wave shall again be directed northwards?

Who could, with advantage to the miserable individuals under his charge, work, either in England or as I did in India, as an inspector of jails, unless he knows the history of the Jail Fever in England, which called into activity Howard and his noble system of prison reform. How, as Stow tells us, in 1414, "the Galores of Newgate and Ludgate dyed, and prisoners in Newgate to the number of sixty-four—through a contagion called the Sickness of the house;" how, in July, 1577, at the Black Assize, at Oxford, those in court were surprised with a pestilent savor, upon which the Lord Chief Baron, almost all the jurors, and three hundred others who were in the court, sickened and died; and how, in May, 1750,—a range, not an intermission, of nearly three hundred years,—at the session of the Old Bailey, four on the bench together with two or three of the counsel, one of the under sheriffs, several of the Middlesex jury, and others present to the amount of forty-nine, were attacked with the disease and perished?

To the working student of public hygiene, a true and full knowledge of the history and minute topography of Old London

before the Fire, when a hundred and thirty thousand citizens were packed, almost in bulk, into the narrow walled space between Cripplegate and Queenhithe, the Fleet River and Aldgate, is what a hospital and a dead-house are to the practical physician. In the records of the one will be found the most typical illustrations of nearly all insanitary things in their full, unchecked development, as in the beds and on the tables of the others will be discovered all morbid objects, open to him who can observe. If a student of medicine tells me that he has just seen two "good cases," I, as a student of old-world sanitation, can give him two, out of hundreds of equal interst. 1st. I read* that, on October 9, 1551, Giles, the King's beer brewer, dwelling at St. Catherine's, *who had bled to death from a scratch on his leg*, was buried this day at Aldgate, with heraldic emblazonments of his arms and the craft of the brewers. Here is a very natural death (of which more than one parallel instance has come under my notice) in a person who breathes a mixture of marsh and sewer gases, and has unrestrained access to intoxicating liquor. 2nd. I note that the inhabitants of the houses on London bridge always escaped the Plague—an early and very striking evidence of the value of free sewage and thorough perflation.

It is a remarkable, but by no means new, observation, that, when I have been engaged in search of any particular branch of knowledge, I have scarcely ever taken up the most ancient and best of all books without discovering, to my surprise, information closely germane to my inquiry. I will give only two instances out of many. The tanks of Bengal are ponds upon which the sun generally shines all day long, and the natives are constantly seen bathing or drawing water there. Magistrates and civil surgeons are well aware that a by no means unhealthy looking Bengali is not unfrequently found lying dead, face downwards, in very shallow water. On post mortem examination no traces of mortal disease are discovered, and much doubt has often arisen as to how the individual came by his death. The neighbors generally say that he had *mrigi*, epilepsy; and this is probably true in many cases. Then there are also many other instances in which Indian epileptics fall into the fire or into the huge kettles

* Henry Machin's Diary.

in which rice is boiled for large parties at festivals. When I mentioned this to Dr. Francis Warner, he remarked that he had recently seen a case in which the epileptic paroxysm was excited by the sight of any bright or dazzling object. So it always is with the spasm of hydrophobia. How clearly is this law in disease expressed in the sacred account of the epileptic demoniac: "Ofttimes it" [the dumb spirit] "hath cast him into the fire, and into the waters, to destroy him" (Mark ix. 22).

Again, it is well known that the Cucurbits are a rather dangerous family, the worst of their number being *Cucumis colocynthis;* but gourds, melons, and cucumbers are generally considered to have a doubtful character for wholesomeness. In working out the subject of Indian poisons, I of course inquired about the Cucurbitaceæ, but found little or nothing for the three editions of my book except the case of a retired officer, at a hill station, who was attacked with symptoms of irritant poisoning, and rapidly died, after eating kuddo, a generally inoxious pumpkin. In May, 1871, there appeared in the *Indian Medical Gazette* two cases of poisoning by *Cucurbita lagenaria*, a wild variety of white pumpkin or bitter cucumber. Not long after I had made a note of this, I came unexpectedly upon the passage * in which we are told that Elisha prepared to scethe pottage for the sons of the prophets, "And one went out into the field to gather herbs, and found a wild vine, and gathered thereof wild gourds his lap full, and came and shred them into the pot of pottage: for they knew them not. So they poured them out for the men to eat. And it came to pass, as they were eating the pottage, that they cried out and said, O thou man of God, there is death in the pot." Here were two absolutely new cases of the present day, standing quite alone and needing confirmation, distinctly capped and paralleled by the very oldest case of poisoning on record!

To the occupations which I have recommended we may justly apply the words of Cicero;—"Hæc studia adolescentiam alunt, senectutem oblectant; secundas res ornant, adversis perfugium ac solatium præbent; delectant domi, non impediunt foris, pernoctant nobiscum peregrinantur, rusticantur."

These remarks are not intended for medical men exclusively.

* 2 Kings IV, 38.

In their general drift they have application to men of all professions who live by a combination of physical toil with mental effort.

"Cease to work on Sundays," was Johnson's dying adjuration to Joshua Reynolds. Medical men are, of course, unable to command any given moment of their time; still, all those who wish it can generally make Sunday a day of rest. It is clearly indispensable that the medical man shall be an early riser, and, when in large practice, he is rarely allowed to waste time in sleep; but, whenever he can get it, his sleep should be quite *ad libitum*. I could never understand a judge who boasted that he restricted himself to five hours' sleep; but it appeared to me that the singular irritability and want of dignity and equanimity which he displayed on the bench were largely attributable to this cause. The greatest and most laborious ruler of India in modern times, Lord Dalhousie, considered that hard study or intense mental labor of any kind cannot be habitually maintained longer than six hours. When more is attempted, the result is muddle. Of one practical fact there can be no doubt: he who works and thinks hard all day cannot afford, systematically or frequently, to spend half the night in any frivolous amusement or intense study. Many elderly men lose their reserve force and break down in vainly attempting these modes of life.

I ought perhaps to apologize here to those who have listened to these details with attention, which is, at once, so courteous and so kind, considering that they, admittedly, have no taste for antiquarian pursuits. Let me entreat them to recur to the advice conveyed in the first part of this address. Let them allow themselves, throughout their active life, a fair amount of rest and recuperative leisure, and search diligently for some well chosen and appropriate mode of occupying that leasure, and employ it, as they work out their professional duties, in a manner becoming the noble calling of enlightened scholars, gentlemen, and physicians.

DR. FERDINAND COLETTI, Professor of Therapeutics in the University of Padua, died recently. Dr. Colletti was the first of the most zealous apostles of cremation in Italy, and he desired, in his will, that his corpse should be transmitted to Milan to be cremated there. His wish was carried out, and the body was burned in the presence of a large assemblage of citizens and of his colleagues, and of political and scientific authorities. Many orations were pronounced in his honor. The ashes were enclosed in a beautiful glass urn, and presented to his family at the expense of the Italian Cremation Society.

THE thirty-second annual session of the Medical Association of Georgia, was held in Thomasville, on April 20 and 21, 1881. The following are the officers for the ensuing year: President, William F. Holt, Macon; First Vice President, Eugene Foster, Augusta; Second Vice President, T. M. McIntosh, Thomasville; Secretary, A. Sibley Campbell, Augusta; Treasurer, K. P. Moore, Forsyth. The next session will be held in Atlanta on the third Wednesday in April (19th) 1882. Communications should be addressed to A. Sibley Campbell, Secretary.

ANATOMICAL PLATES.—Messrs. G. P. Putnam & Sons desire to state that, through a clerical error, the name of the late Prof. GRANVILLE SHARP PATTISON, as translator and editor of the edition of MASSE'S ANATOMICAL PLATES, issued in 1845, has been omitted from the title page of their present edition. They would also explain that Prof. RANNEY'S labor as editor embraced such alterations of the plates and text as was required to bring these fully up to date, together with the preparation of important new material in the way of diagrams and descriptive text.

Please paste over preface of "Anatomical Plates" of Masse, and oblige

A. L. RANNEY, M.D.

A larger portion of this preface should be accredited to the late Prof. PATTISON, a former editor of these plates, to whom due credit has been omitted by an oversight on the part of the present editor.

SOCIETY MEETINGS.

Chicago Medical Society—Mondays, June 6-20.
West Chicago Medical Society—Mondays, June 13-27.
Biological Society—Wednesday, June 1.

CLINICS.

MONDAY.

Eye and Ear Infirmary—2 p. m., Ophthalmological, by Prof. Holmes; 3 p. m., Otological, by Prof. Jones.
Mercy Hospital—2 p. m., Surgical, by Prof. Andrews.
Rush Medical College—2 p. m., Dermatological and Venereal, by Prof. Hyde.
Woman's Medical College—2 p. m., Dermatological and Venereal, by Prof. Maynard; 3 p. m., Diseases of the Chest, Prof. Ingals.

TUESDAY.

Cook County Hospital—2 to 4 p. m., Medical and Surgical Clinics.
Mercy Hospital—2 p. m., Medical, by Prof. Quine.

WEDNESDAY.

Chicago Medical College—2 p. m., Eye and Ear, by Prof. Jones.
Rush Medical College—2 p. m., Medical, by Dr. Bridge; 3 p. m., Ophthalmological and Otological, by Prof. Holmes; 3:30 to 4:30 p. m., Diseases of the Chest, by Dr. E. Fletcher Ingals.

THURSDAY.

Chicago Medical College—2 p. m., Gynæcological, by Prof. Jenks.
Rush Medical College—2 p. m., Diseases of Children, by Dr. Knox; 3 p. m., Diseases of the Nervous System, by Prof. Lyman.
Eye and Ear Infirmary—2 p. m., Ophthalmological, by Dr. Hotz.
Woman's Medical College—3 p. m., Surgical, by Prof. Owens.

FRIDAY.

Cook County Hospital—2 to 4 p. m., Medical and Surgical Clinics.
Mercy Hospital—2 p. m., Medical, by Prof. Davis.

SATURDAY.

Rush Medical College—2 p. m., Surgical, by Prof. Gunn; 3 p. m., Orthopœdic, by Prof. Owens.
Chicago Medical College—2 p. m., Surgical, by Prof. Isham; 3 p. m., Neurological, by Prof. Jewell.
Woman's Medical College—11 a. m., Ophthalmological, by Prof. Montgomery; 2 p. m., Gynæcological, by Prof. Fitch.

Daily Clinics, from 2 to 4 p. m., at the Central Free Dispensary, and at the South Side Dispensary.